Appendix 9-D

Characterization of Groundwater – Surface Water Interactions

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FINAL

Memo

To	Karyn Lewis	**Project**	NA 393100.010
From	Claudia Hidalgo, Marcie Schabert, Daniel Mackie	**Reg. No.**	EGBC 1003655
Cc	David Hoekstra, Brent Thiele	**Date**	July 2023
Client	NWP Coal		

Subject Crown Mountain Project, Second Conformity Review – Response to

1 Introduction

NWP Coal has requested SRK Consulting to respond to a second round of information requests from the federal government (IAAC) regarding the revised Crown Mountain Environmental Impact Statement. This document responds to the second information requirement related to IR ID #461 of the Table of Concordance:

ID#461, Second IR: ***"Characterize the relationship between groundwater and surface water quality for baseline samples and water quality predictions (i.e., how groundwater chemistry affects surface water chemistry, and vice-versa). Include detail on the variability in groundwater surface water interactions due to seasonal and/or inter-annual changes, and how this affects surface and groundwater quality baseline samples and water quality predictions."***

The response is organized as follows:

Section 2: Data – describes available data to characterize groundwater – surface water interactions. This includes data presented with the original project EA and summarized within the *Groundwater Technical Report* (SRK 2021) as well as surface water quality and flow rates at selected surface water stations from March 2012 to March 2023. Selected data is presented with references to larger datasets not fully reproduced here.

Section 3: Interpretation and Discussion – presents interpretation of data and response to specific requests within the IR.

2 Data

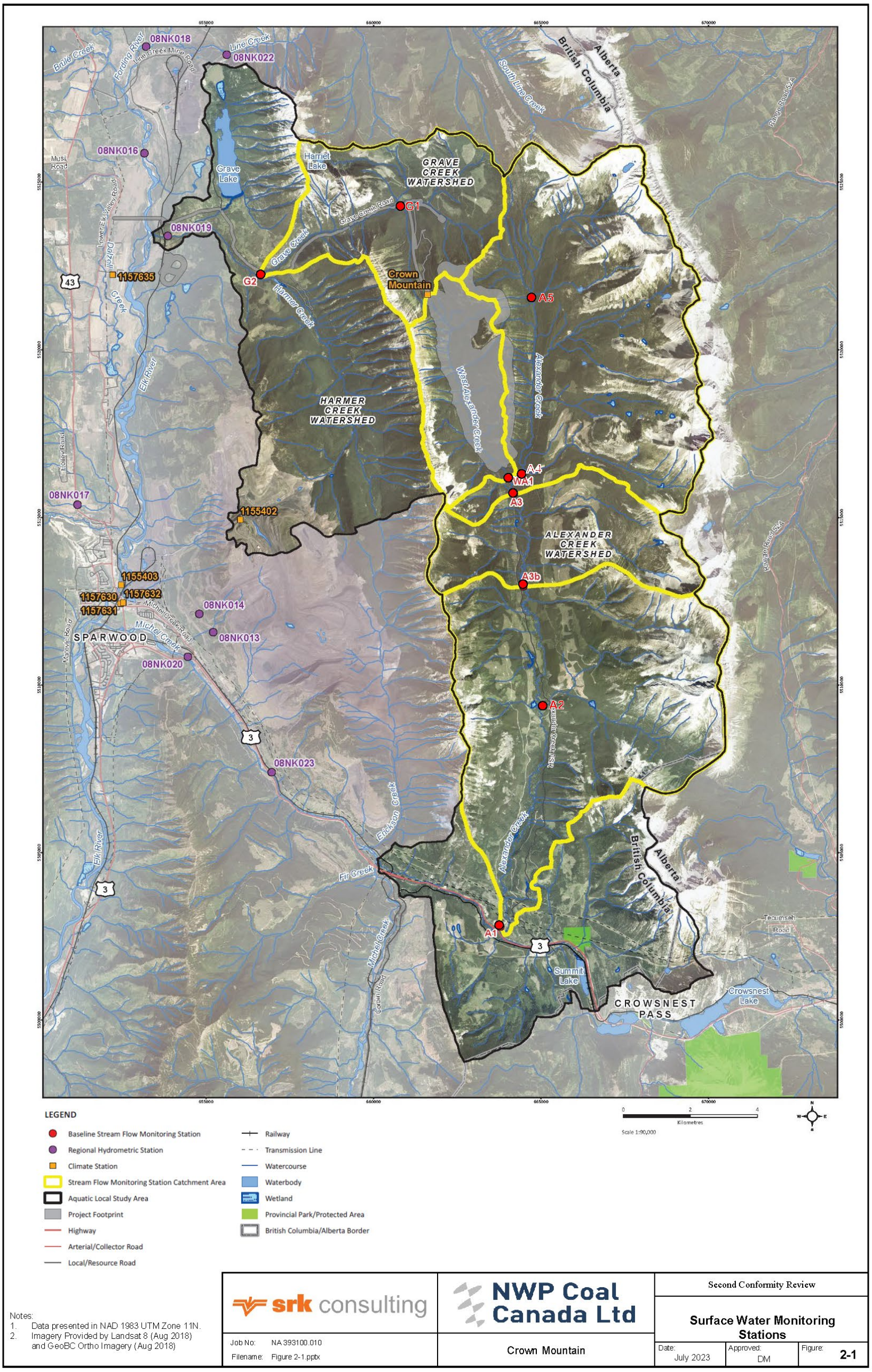
2.1 Locations

Table 2-1 presents the monitoring stations that have been included in this analysis and the timeframe of the data that is available to date. Figure 2-1 shows surface water monitoring stations. Figure 2-2 shows groundwater monitoring stations and locations of measurements from a flow accretion study completed as part of the hydrogeology characterization program.

Table 2-1. Monitoring Stations and data available

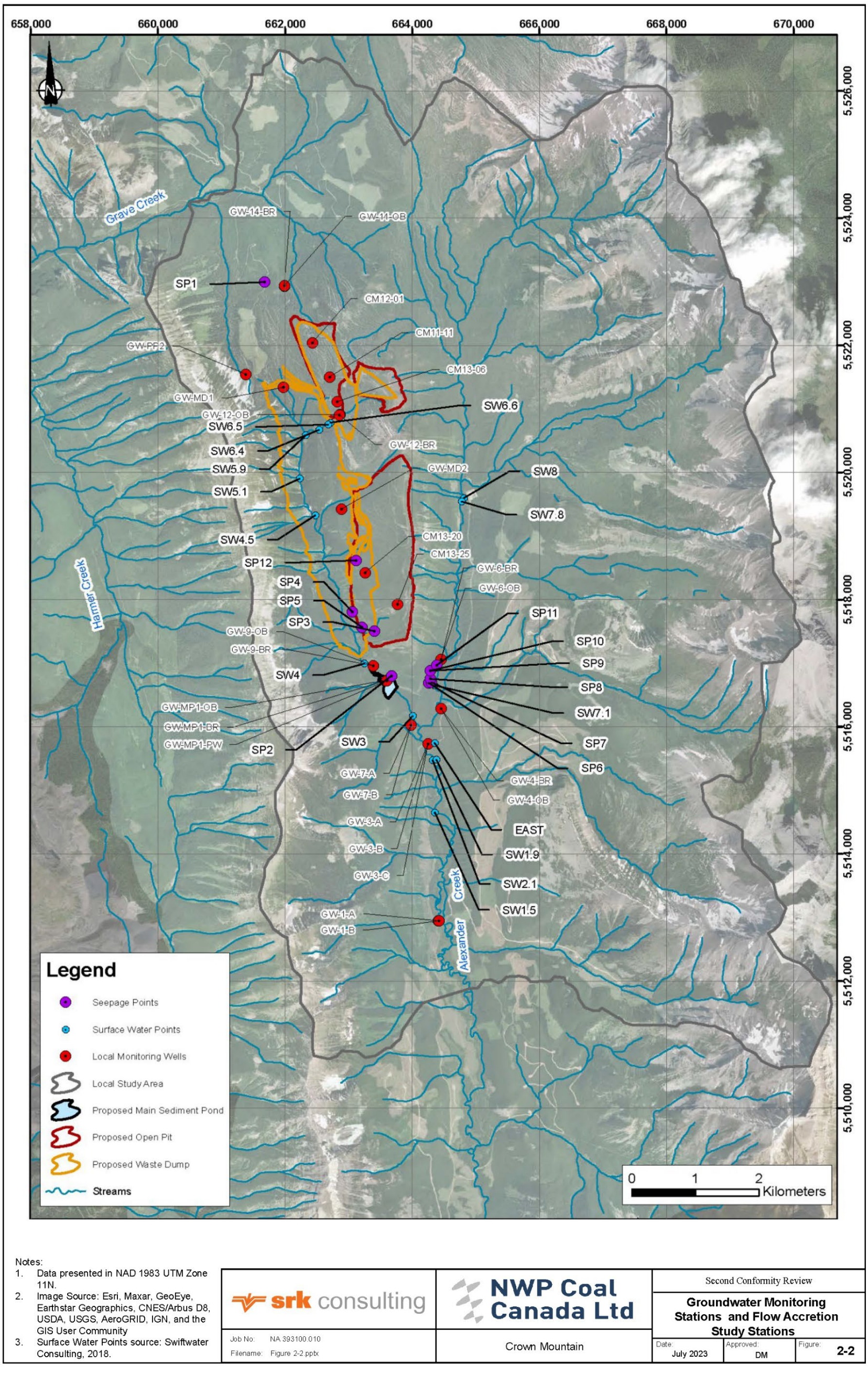
Type	Station ID	Location	Data available	Data period available		Number of water quality samples
				From	To	
Groundwater	GW-14-OB	Upgradient the project development and upgradient G1	Water Quality and Levels	Oct-18	Oct-22	10
	GW-14-BR		Water Quality and Levels	Nov-18	Oct-22	10
	CM-12-01	North of West Alexander Creek	Water Quality and Levels	Aug-14	Oct-22	13
	CM-11-11		Water Quality and Levels	Aug-14	Oct-22	13
	CM-13-06		Water Quality and Levels	Oct-15	Oct-22	12
	GW-12-OB	Upper West Alexander Creek	Water Quality and Levels	Aug-19	Oct-22	4
	GW-12-BR		Water Quality and Levels	Jun-19	Oct-22	7
	GW-PP2	North of West Alexander Creek	Water Quality and Levels	Jun-19	Oct-22	6
	GW-MD1		Water Quality and Levels	Jun-19	Jun-19	1
	GW-MD2	Upgradient West Alexander creek	Water Quality and Levels	Nov-18	Oct-22	8
	CM-13-20	Ridge between East and West Alexander creeks	Water Quality and Levels	N/A	N/A	N/A
	CM-13-25		Water Quality and Levels	Aug-14	Oct-22	11
	GW-6-OB	East Alexander Creek upgradient the confluence with West Alexander creek	Water Quality and Levels	Mar-19	Oct-22	10
	GW-6-BR		Water Quality and Levels	Jun-19	Oct-22	8
	GW-9-OB	West Alexander creek upgradient the confluence with East Alexander creek	Water Quality and Levels	Mar-19	Oct-22	10
	GW-9-BR		Water Quality and Levels	May-19	Oct-22	7
	GW-MP1-OB	West Alexander creek upgradient the confluence with East Alexander creek and downgradient GW-9-OB	Water Quality and Levels	Mar-19	Oct-22	9
	GW-MP1-BR		Water Quality and Levels	Jun-19	Oct-22	9
	GW-MP1-PW		Water Quality and Levels	Mar-19	Oct-22	9
	GW-4-OB	East Alexander creek upgradient the confluence with West Alexander creek and downgradient GW-6-OB and near A4	Water Quality and Levels	Nov-18	Oct-22	5
	GW-4-BR		Water Quality and Levels	Nov-18	Oct-22	12
	GW-7-A	West Alexander creek at the confluence with East Alexander creek between WA1 and A3	Water Quality and Levels	Nov-18	Oct-22	12
	GW-7-B		Water Quality and Levels	Nov-18	Nov-18	1
	GW-3-A	At the confluence between East and West Alexander creek near A3	Water Quality and Levels	Nov-18	Oct-22	12
	GW-3-B		Water Quality and Levels	Nov-18	Oct-22	12
	GW-3-C		Water Quality and Levels	Nov-18	Oct-22	12
	GW-1-A	Downgradient the project in Alexander creek near A3 (B)	Water Quality and Levels	Nov-18	Oct-22	12
	GW-1-B		Water Quality and Levels	Nov-18	Oct-22	11
Surface Water	A1	Alexander Creek	Water Quality	N/A	N/A	N/A
			Discharge	Jan-13	Sep-19	N/A
	A3 (B)	Alexander creek near GW-1-A and GW-1-B	Water Quality	Jul-14	Aug-22	31
			Discharge	Jan-14	Dec-16	N/A
	A2	Alexander creek downstream A3(B) and upstream the confluence with Michelle creek	Water Quality	May-12	Mar-23	65
			Discharge	N/A	N/A	N/A
	G2	Grave creek	Water Quality	May-12	Mar-23	65
			Discharge	Jan-13	Sep-19	N/A
	A3	Alexander Creek at the confluence between West and East Alexander creeks	Water Quality	May-12	Nov-20	25
			Discharge	N/A	N/A	N/A
	A4	East Alexander creek immediately upstream the confluence with West Alexander creek	Water Quality	May-12	Mar-23	60
			Discharge	N/A	N/A	N/A
	WA1	West Alexander creek immediately upstream the confluence with East Alexander creek	Water Quality	May-12	Mar-23	63
			Discharge	Jan-13	Dec-16	N/A
	A5	East Alexander creek upstream confluence of West and East Alexander creeks	Water Quality	Jun-12	Mar-23	64
			Discharge	N/A	N/A	N/A
	G1	Grave creek	Water Quality	May-12	Aug-22	63
			Discharge	N/A	N/A	N/A

Note: GW-7-B was removed from the monitoring program in 2020 due to sampling problems related to water availability.



Source: Modified from Chapter 10 – Surface Water Quantity Assessment, EA Application

Figure 2-1. Surface Water Monitoring Stations



Notes:
1. Data presented in NAD 1983 UTM Zone 11N.
2. Image Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Arbus D8, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3. Surface Water Points source: Swiftwater Consulting, 2018.

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Crown Mountain

Groundwater Monitoring Stations and Flow Accretion Study Stations

Date: July 2023 | Approved: DM | Figure: 2-2

Figure 2-2. Groundwater Monitoring Stations and Flow Accretion Study Stations

2.2 Surface Water

2.2.1 Surface Water Flow

Surface water flow data is available from two sources: 1. Repeat flow measurement data from three stations within the Alexander Creek catchment and one station within the Grave Creek catchment, and 2. Results from a flow accretion survey within the Alexander Creek catchment.

Flow records within the Alexander Creek catchment include the following stations (Figure 2-1):

- West Alexander Creek station WA1, located upstream of the confluence with East Alexander Creek.
- Alexander Creek station A3 (B), located downstream of the confluence with East Alexander Creek.
- Alexander Creek station A1, located downstream of the project above the confluence with Michel Creek. surface water monitoring stations in the vicinity of groundwater monitoring stations.

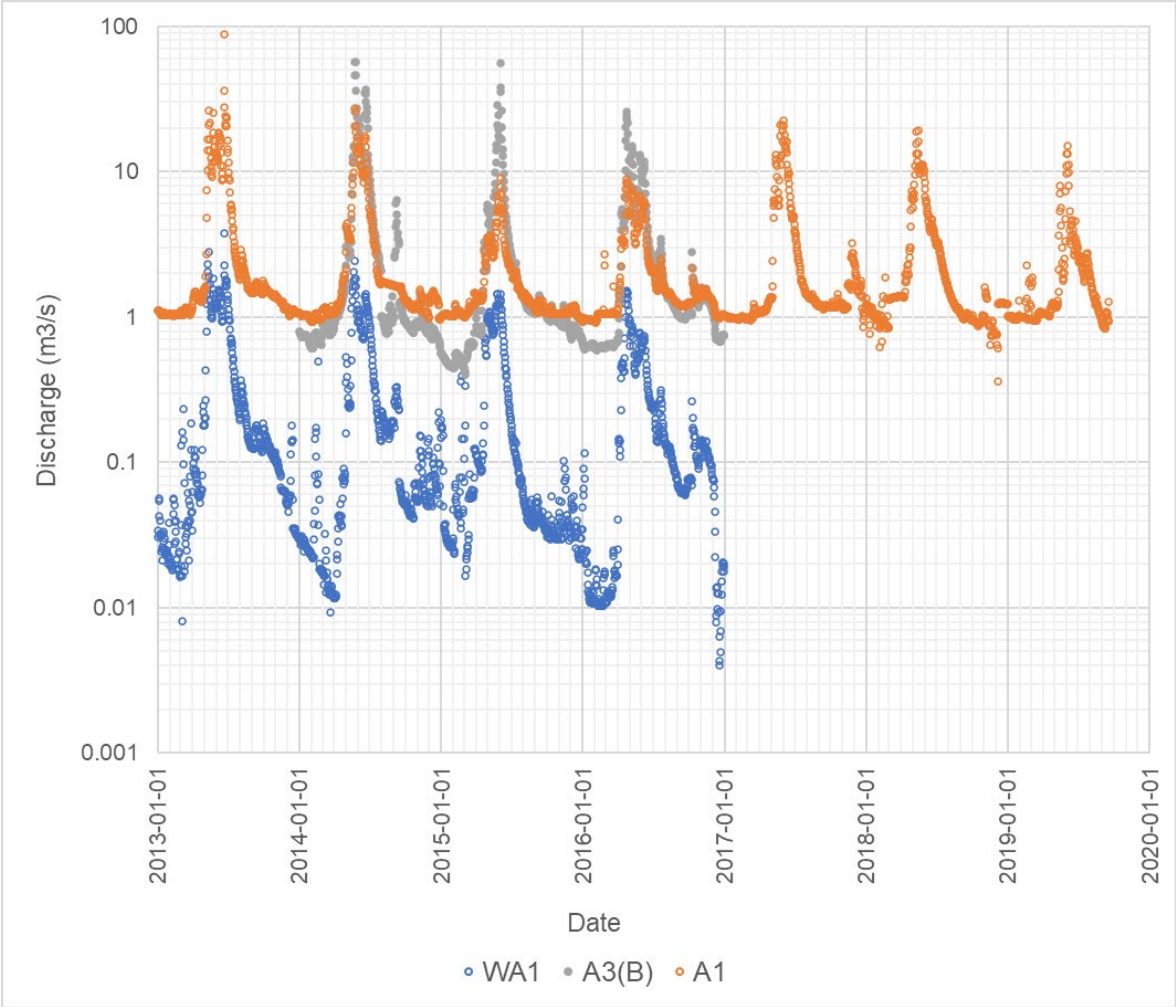
Flow records within the Grave Creek catchment include the following station (Figure 2-1):

- Grave Creek station G2, located downstream of the confluence with Harmer Creek.

Full description of these stations and station hydrology are presented in ***Crown Mountain Coking Coal Project, Application for an Environmental Assessment Certificate / Environmental Impact Statement, Chapter 10 – Surface Water Quantity Assessment***.

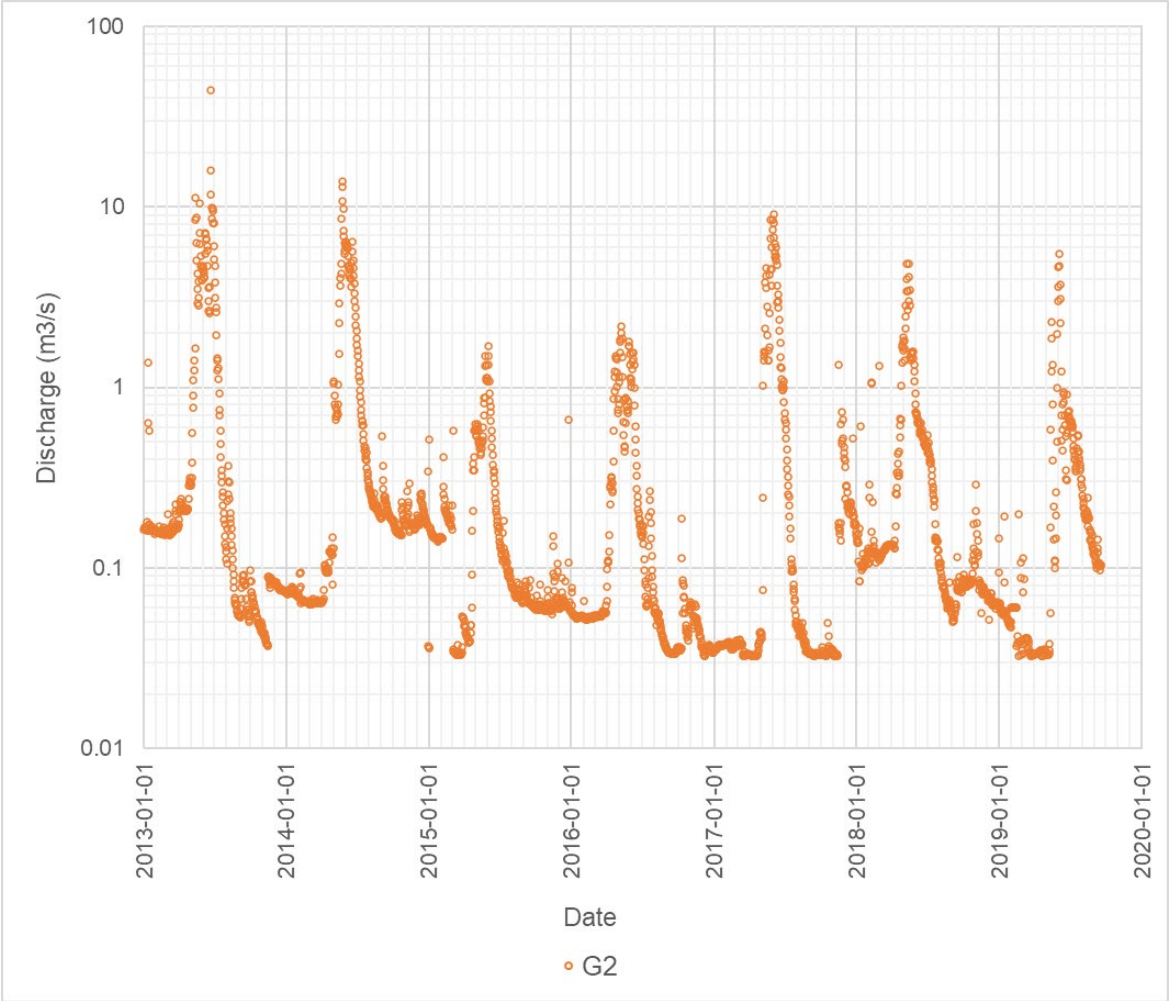
Flow records for the three Alexander Creek catchment stations are shown in Figure 2-3.

Section 3 presents discussion of changes in flow rates in combination with other data to assess gaining and losing reaches.



Source: NA393100.010/SRK/Internal/0200_Hydrogeology/TablesCrownMountain.xlsx

Figure 2-3. Surface Water Discharge Data for Alexander Creek Catchment



Source: NA393100.010/SRK/Internal/0200_Hydrogeology/TablesCrownMountain.xlsx

Figure 2-4. Surface Water Discharge Data for Grave Creek Catchment

A flow and load accretion study was conducted in October 2018 to collect data on gaining and losing reaches of West Alexander, East Alexander and Alexander creeks in the local groundwater study area (SRK, 2021). Measurement stations are included on Figure 2-2.

Section 3 presents discussion of this data to assist in definition of groundwater discharge and recharge zones.

Table 2-2. October 2018 Flow Accretion Study Results

Location		Easting	Northing	Date	Time	Discharge (L/s)	Uncertainty %	Distance km	Comments
East Alexander Creek	SW8	664,815	5,519,596	10/2/2018	11:20:00 AM	48	5.1	4.6	
	SW7.8	664,777	5,519,542	10/2/2018	1:00:00 PM	54	6.3	4.6	
	SW7.1	664,349	5,516,650	10/2/2018	3:47:00 PM	318	3.2	1.4	
	EAST	664,355	5,515,744	10/2/2018	4:54:00 PM	216	5.1	0.3	
	SW1.9	664,384	5,515,478	10/4/2018	9:01:00 AM	184	4.7	0.0	
West Alexander Creek	SW6.6	662,710	5,520,782	10/3/2018	9:02:00 AM	0	-	7.0	Visual Estimate
	SW6.5	662,677	5,520,753	10/3/2018	9:11:00 AM	1	-	6.8	Visual Estimate
	SW6.4	662,536	5,520,670	10/3/2018	10:17:00 AM	5	0.0	6.6	Visual Estimate
	SW5.9	662,325	5,520,585	10/3/2018	11:09-11:30	7	12.5	6.5	
	SW5.1	662,232	5,519,903	10/3/2018	12:17-12:42	11	3.8	5.8	
	SW4.5	662,479	5,519,327	10/3/2018	13:36-13:54	15	11.9	5.1	
	SW4.5	662,479	5,516,994	10/3/2018	4:42:00 PM	30	25.0	2.3	
	SW3	664,011	5,516,173	10/4/2018	6:48-7:10	28	2.9	1.0	
	SW2.1	664,323	5,515,471	10/4/2018	8:19:00 AM	28	-	0.0	Same Flow as SW3
Alexander Creek	SW1.9	664,384	5,515,478	10/4/2018	8:11-9:01	184	4.7		
	SW1.5	664,359	5,514,654	10/4/2018	9:34-10:25	169	2.1		

Source: Table 3-2 from Groundwater Technical Report for Crown Mountain Coking Coal Project (SRK, 2021)

2.2.2 Surface Water Quality

Surface water quality data are presented in full in:

- ***Crown Mountain Coking Coal Project, Application for an Environmental Assessment Certificate / Environmental Impact Statement, Appendix 11B – Surface Water Quality Baseline Report.***
- ***Crown Mountain Coking Coal Project, Application for an Environmental Assessment Certificate / Environmental Impact Statement, Chapter 11 – Surface Water Quality Assessment.***

Attachment 1 summarizes average monthly concentrations for constituents of interest at different surface water flow and quality monitoring stations.

2.3 Groundwater

2.3.1 Groundwater Levels

Water level data for groundwater monitoring stations showed in Figure 2-1 are presented in *Groundwater Technical Report* (SRK 2021) and Attachment 2. Section 3 describes use of groundwater level data to calculate vertical gradients and combination with flow data to define groundwater recharge and discharge zones.

2.3.2 Groundwater Quality

Groundwater quality data for groundwater monitoring stations showed in Figure 2-1 are presented in *Groundwater Technical Report* (SRK 2021). Attachment 1 includes average monthly concentrations for constituents of interest at groundwater monitoring locations. Time series data are presented in Attachment 3 and Attachment 4 presents box and whisker plots for COI's and constituents discussed in Section 3.

3 Interpretation and Discussion

3.1 Characteristics of the relationship between groundwater and surface water quality for baseline samples

3.1.1 Surface Water Flow

Surface water flow data (Figure 2-3 and Figure 2-4) and results from the flow accretion survey (Table 2-2) show:

- Between West Alexander Creek (WA1) and Alexander Creek (A3(B)).
  - Consistent relationship of higher flow at A3(B) than WA1 for all seasons though magnitude of difference in flows varies – greatest difference during freshet.
  - In October 2018 (early low flow season), flow near the end of East Alexander Creek was approximately 6.5x greater than flow near the end of West Alexander Creek.
  - 2018 flow accretion survey indicated minor flow decrease between SW4.5 and SW3 (Figure 2-2) within the area of confluence with East Alexander.
  - Long term data suggests overall gaining system between these two stations, but there is loss in the vicinity of the West Alexander – East Alexander confluence.
- East Alexander Creek to Alexander Creek (A3(B)).
  - There is no longer duration flow monitoring station on East Alexander Creek, but results from 2018 flow accretion survey suggest flow at that time was approximately 6.5x greater than in West Alexander Creek.

  - 2018 flow accretion survey indicated increasing flow until station SW7.1, then flow decrease to station SW1.9, just before the confluence with West Alexander Creek (note, the stream linework shown on Figure 2-2 is not exactly correct in the confluence area; East Alexander continues to SW1.9 just before confluence with West Alexander).
  - Similar to West Alexander, overall the East Alexander system is gaining, but there is loss in the vicinity of the West Alexander – East Alexander confluence.
- Alexander Creek between stations A3B and A1.
  - Flows at these two stations are often similar in magnitude with seasonal differences.
  - During low flow season, flow increases between A3B and A1.
  - During spring freshet, flows are similar but can be higher at A3B than A1.
  - Overall, flows are typically gaining along this reach.
- Flow in Grave Creek shows seasonal variation typical of this region, but there is only a single station so changes along its length cannot be assessed from flow data alone.

3.1.2 Groundwater Gradients

Groundwater level data collected from paired monitoring wells since October 2018 were used to calculate vertical gradients (Table 2-3). No changes with respect to what was stated in SRK (2021) have been observed after integrating more recent data to the analysis.

Table 2-1. Vertical Groundwater Hydraulic Gradients

Area	Station ID	Vertical Gradient	# of Readings	Comments
West Alexander	**GW-9-OB / GW-9-BR**	Upward (0.05 to 0.13)	6	Single downward gradient in March 2019 (-0.03). Overall increasing upward gradient 2018 to 2022. No clear seasonality.
	GW-MP1- OB / GW-MP1-BR	Downward (-0.30 to -0.23)	10	Consistent and stable gradient for entire record. No clear seasonality.
	GW-7-A / GW-7-B	Downward (-0.37 to -0.34)	2	Consistent gradient but limited record. No clear seasonality.
East Alexander	**GW-6-OB / GW-6-BR**	Downward (-0.62 to -0.01)	8	Consistent gradient for entire record but variable magnitude. No clear seasonality
	GW-4-OB / GW-4-BR	Downward (-0.31 to -0.24)	4	Consistent gradient but limited record. No clear seasonality.
Alexander Creek	**GW-3-A / GW-3-B / GW-3-C**	Variable[1] (-0.04 to -0.02)	24	Gradient direction shows some variability but gradient magnitude is low, often <0.1. No clear seasonality.
	GW-1-A / GW-1-B	Downward (-0.06 to -0.03)	12	Consistent low magnitude gradient. No clear seasonality
Grave Creek	**GW-14-OB / GW-14-BR**	Downward (-0.07 to -0.02)	10	Single upward gradient in October 2019 (0.03). Otherwise Consistent gradient for entire record but variable magnitude. Possible seasonality with strongest downward gradient in late spring (May).

Note: the difference between water levels in these monitoring wells could correspond to the manual measurement error.

3.1.3 Groundwater and Surface Water Quality

Groundwater and surface water quality data were reviewed to understand potential interactions. Summaries of data used in this are attached to this document. In addition to the data presented in Attachments 1 to 4, Attachment 5 includes cross plots of different parameters and Piper diagrams used in specific areas to assess water types. Findings are summarized below.

General Observations

Surface water and groundwater data was plotted together on Piper Plots (Attachment 5) to qualitatively assess differences or similarities in water types. Review indicates:

- Water quality from wells completed in bedrock (generally deeper) tend to plot differently than surface water, with higher SO_4/Cl, higher Na/K, lower HCO_3/CO_3 and lower Ca/Mg than wells completed in overburden (generally shallower) and also surface water.
- Water quality from most wells completed in overburden tend to plot similarly to surface water.
- Water quality from wells completed in overburden can also plot between water quality from bedrock wells and surface water.
- These trends generally apply to all areas of the Alexander Creek catchment.

West Alexander Creek

Stations used included WA1 for surface water and both shallow and deep wells at the GW-12, CM-13-25, GW-09, GW-MP1, GW-MD2 and GW-07 locations.

Samples from overburden groundwater wells tend to have concentrations of COI's relatively similar to surface water, concentrations can vary higher or lower than average surface water. COI concentrations in deeper bedrock groundwater can also be similar, though differences can be observed at GW-09-BR.

The cross plots of parameter ratios for the GW-09 well cluster and surface water station WA1 illustrates a similarity between surface water and overburden, and the relatively larger difference between surface water and deeper bedrock water quality. The GW-09 cluster is located between the downstream toe of the proposed Waste Rock Dump and Waste Rock Sedimentation Pond. Mg/Ca, SO_4/HCO_3 and K/Na cross plots show clear groupings for surface water, overburden groundwater and bedrock groundwater, with bedrock groundwater having distinctly different ratios to surface water with overburden groundwater much more similar to surface water. F/NO_3-N ratios show a different pattern than other ratios, but similar groupings and surface water tending to be more similar to overburden groundwater than bedrock groundwater. The different patterns are a result of low NO_3-N concentrations in bedrock groundwater.

Despite some differences, on average surface water and most overburden groundwater is generally similar. Deeper groundwater can be distinct, typically with relatively higher parameter concentrations than surface water, but not always. Surface water is interpreted to be distinctly different than bedrock waters while overburden groundwater is generally similar to surface water.

East Alexander

Stations used included A4 and A5 for surface water and both shallow and deep wells at the GW-06 and GW-04 locations.

Water characteristics are similar to West Alexander Creek except that the differences between bedrock groundwater vs. overburden ground and surface water are more distinct. Concentrations of most COI's show concentrations generally similar to surface water.

Both timeseries plots and cross plots for the GW-06 and GW-04 wells show distinct differences in sulphate and sodium between the bedrock waters compared from surface water, and cross plots show bedrock groundwaters grouping significantly different than surface water or overburden water.

On average, surface water and most overburden groundwater is generally similar, but different than deeper groundwater.

Alexander Creek

Stations used included A3 and A3(B) for surface water and both shallow and deep wells at the GW-03 and GW-01 locations.

Looking at cross plots, water characteristics at the GW-01 cluster (southern-most groundwater wells along Alexander Creek are generally similar to West Alexander Creek and East Alexander Creek. Water characteristics at GW-03 (located near confluence of West Alexander and East Alexander creeks) are somewhat different than other areas, with generally more common similarities between different waters. In particular, surface water shows similarities to the relatively shallow GW-03-B and -A wells (K-Na and F-NO_3), though even similar for some samples to deeper groundwater. with the ex except that the differences between bedrock groundwater vs. overburden ground and surface water are more distinct. Concentrations of most COI's show concentrations generally similar to surface water.

Water quality data suggests that the area of the West Alexander / East Alexander confluence may reflect more mixing of shallow and deep water and similarity to surface water.

3.1.4 Seasonality and Inter-Annual Variability

In West Alexander Creek, seasonal trends in groundwater data can be seen for some parameters, but not all. At wells CM-13-25, GW-MP1-BR, GW-MP1-OB and GW-MP1-PW, sulphate can be lower during May and June but the number of samples during this period of year are relatively limited, and it is not possible to tell if this is consistent across the entire West Alexander Creek area. Parameters such as sodium may also show seasonal variation in some wells similar to WA1, but again not strong or consistent. Seasonal trends in groundwater are not strong at East Alexander creek monitoring stations or the Alexander Creek monitoring stations.

Qualitatively, at the scale of the monitoring network seasonal differences in groundwater-surface water interaction may occur locally based on water quality trends. Different relationships may be observed at the very local scale (e.g., the hyporheic zone immediately under creeks) but this level of detail cannot

be assessed with the current monitoring network. In general, relative magnitude of interaction related to water quality is assumed to be more important in lower flow periods when groundwater flows and surface water flows are relatively more similar compared to higher flow periods when surface water flows are relatively much more significant than groundwater flows.

3.1.5 Baseline Conceptual Site Model

The baseline conceptual model is described in full in SRK (2021). Summary illustrations from SRK (2021) are presented in Figure 3-1 to Figure 3-3. The areas of West Alexander Creek and East Alexander Creek are interpreted as groundwater discharge zones (generally gaining reaches), transitioning to a groundwater recharge zone (generally losing reaches) in the vicinity of the confluence between the two upper catchment creeks.

Alexander Creek is interpreted as a losing stream, at least to the downstream end of the Project local study area. Further downstream, it is possible that gaining/losing characteristics of Alexander Creek change.

Figure 3-1. Groundwater Conceptual Model

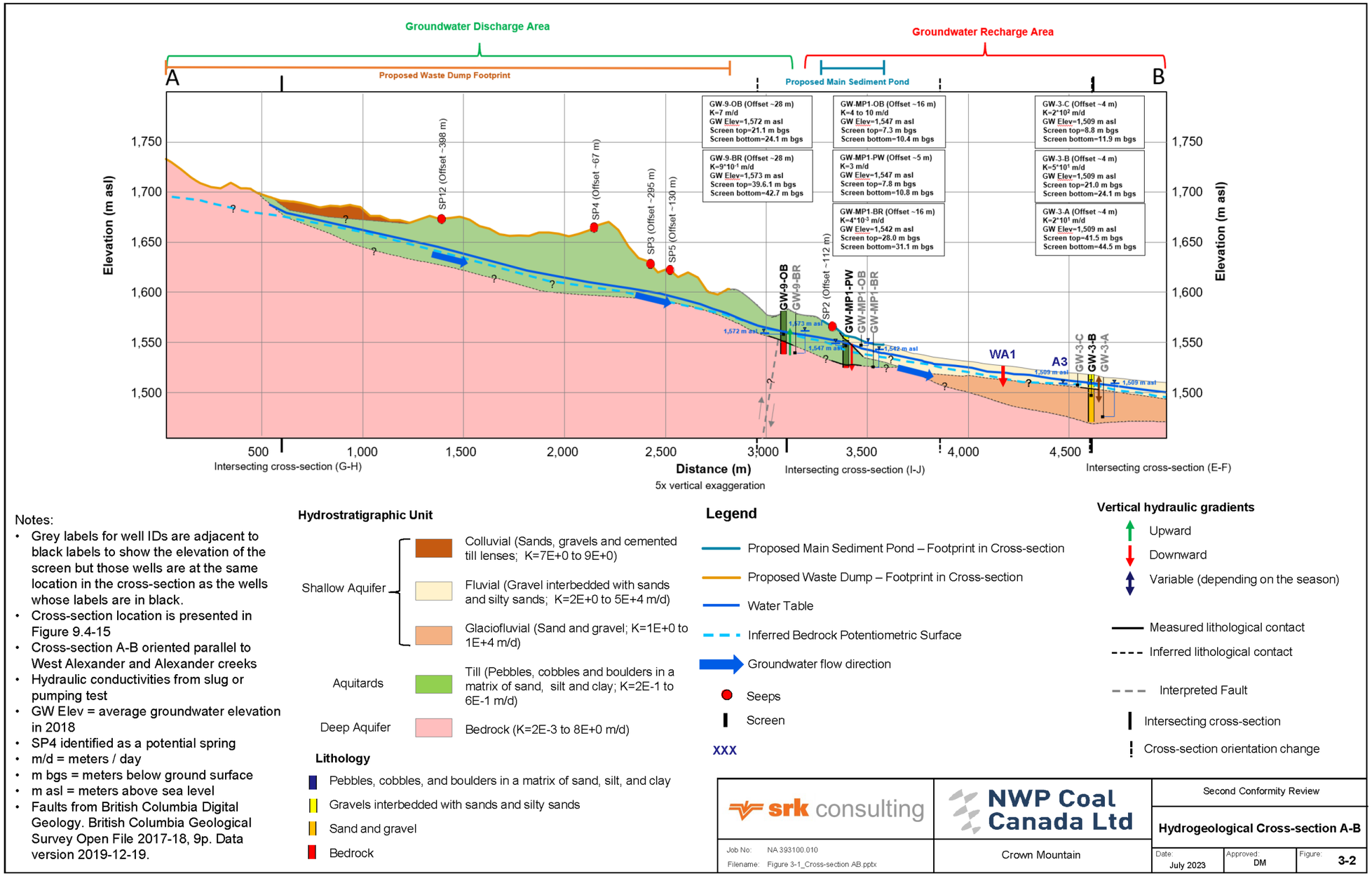


Figure 3-2. Cross-section A-B

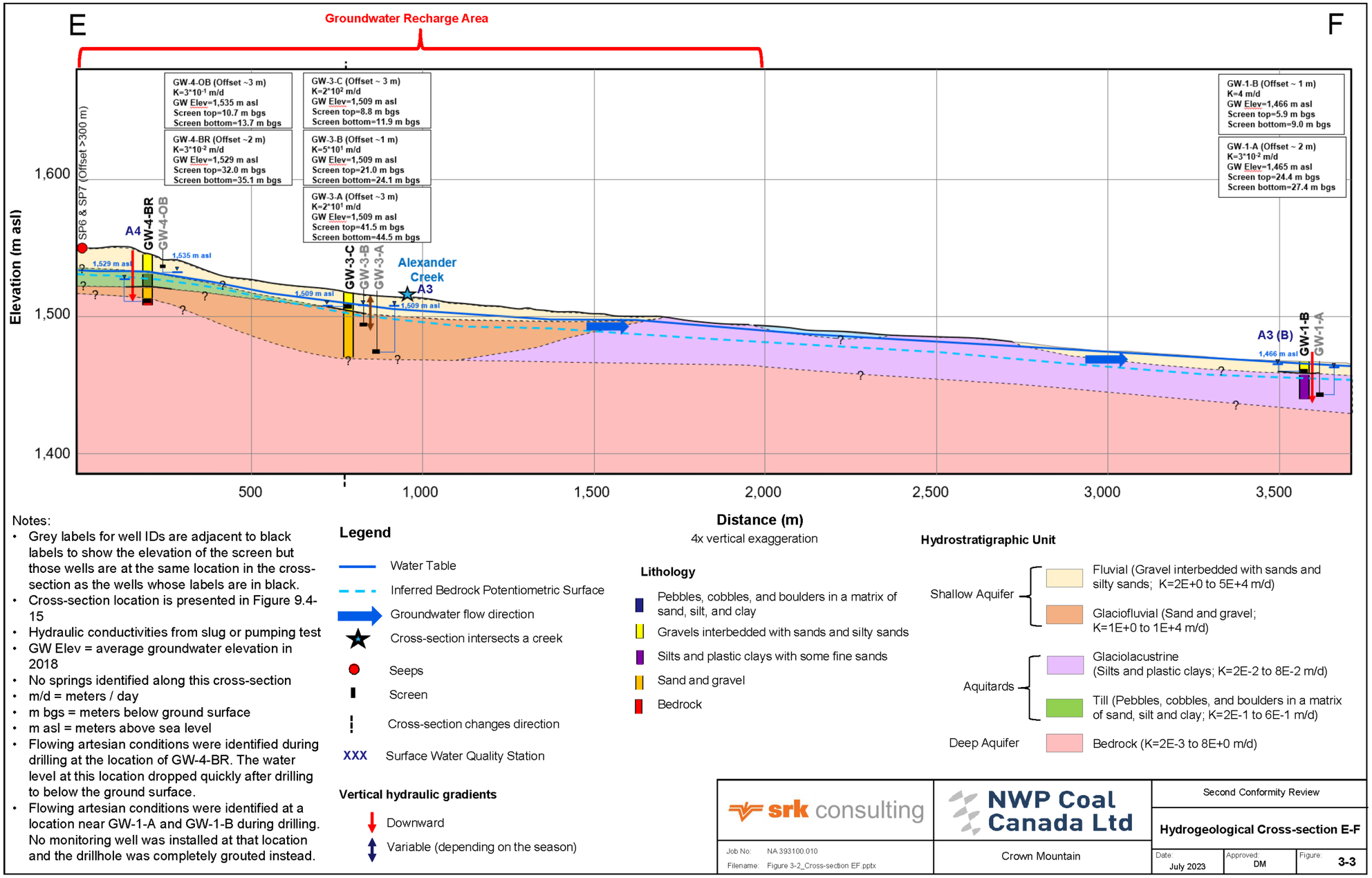


Figure 3-3. Cross-section E-F

3.2 Characteristics of the relationship between groundwater and surface water quality for water quality predictions

A summary of model assumptions for groundwater – surface water interactions, and consequent assumed characteristics of the relationship between groundwater and surface water quality are presented below. Actual characteristics for these periods cannot be assessed as these reflect conditions that do not yet exist.

Surface water quality predictions assume that all water sourced from mining areas reports to surface water. No specific surface water – groundwater pathway is assumed. This is a conservative assumption from the perspective of chemical load in surface water (all chemical load reports to surface water).

Groundwater water quality predictions were based on a scaling source terms to breakthrough characteristics defined by the calibrated groundwater model (SRK 2021). For the scenarios reflecting active mining, boundary conditions for the sedimentation ponds and Alexander Creek downstream of the sedimentation pond were defined to allow groundwater to discharge into surface water or for surface water to infiltrate to the groundwater system. Conservative mass transport was used to define breakthrough curves (C/Co trends) for a theoretical conservative constituent. Groundwater quality for this future scenario was then predicted by scaling the source term by the C/Co ratio at a number of different locations.

This approach to estimating future groundwater quality honored the conceptual model and is generally considered to be conservative but can't be assumed to provide definition of small scale variations along Alexander Creek. As with the surface water quality predictions, all load is assumed to be able to interact with groundwater and/or surface water, but actual water quality will be significantly affected by geochemical performance of the layered waste rock dumps and any reactions that can occur along groundwater or surface water pathways (e.g., redox reactions, mineral precipitation, adsorption, etc.).

While the models do not attempt (or are able) to simulate small scale surface water – groundwater interactions, the models are constructed in a manner which is expected to provide conservative estimates of potential water quality in the future.

Closure

This memo provides response to the second information requirement related to IR ID #461 of the Table of Concordance:

Regards,
SRK Consulting (Canada) Inc.

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EGBC Permit to Practice Reg. No. 1003655

Attachments:

Attachment 1. Monthly Water Quality Summaries
Attachment 2. Water Levels
Attachment 3. Water Quality – Time Series Plots
Attachment 4. Water Quality – Box and Whisker Plots
Attachment 5. Cross Plots and Piper Diagrams

References

SRK, 2021. Groundwater Technical Report. Crown Mountain Coking Coal Project, British Columbia, Canada. NWP Coal Canada Ltd. Dated October 2021.

Attachment 1 Monthly Water Quality Summaries

Grave Creek												
Parameter	Station ID	CM-11-11	CM-12-01	CM-13-06	GW-14-BR	GW-14-OB	GW-MD1	GW-PP2	G1	G2	Surface Water Quality - Predictions	
	Screened Unit	BR	BR	BR	BR	BR/OB - Till	BR	BR	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Nitrate (as N) [mg/L]	January											158
	February											158
	March	0.0146 (1)								0.0867 (2)		163
	April											173
	May				0.005 (1)	0.0825 (1)						169
	June	0.0091 (2)	0.0886 (2)	0.0243 (3)			0.0769 (1)	0.0087 (1)	0.0068 (1)	0.0607 (1)		166
	July	0.005 (1)	0.0633 (1)	0.0313 (2)								165
	August	0.005 (1)	0.0208 (1)	0.0476 (1)	0.0117 (2)	0.0636 (1)		0.0164 (1)	0.008 (2)	0.0629 (2)		164
	September	0.027 (1)	0.005 (1)	0.0395 (1)	0.0121 (2)	0.0594 (1)		0.0755 (1)	0.005 (1)	0.0443 (1)		165
	October	0.0119 (5)	0.0477 (5)	0.0336 (4)	0.0535 (3)	0.0852 (3)		0.0482 (2)				165
	November		0.0108 (1)	0.0594 (1)	0.005 (3)	0.0542 (1)			0.0422 (1)	0.126 (1)		165
	December								0.0423 (1)	0.101 (1)		163
Nitrate (as NO3-) [mg/L]	January								0.0657 (3)	0.1173 (3)	0.149	158
	February								0.0307 (3)	0.1127 (3)	0.154	158
	March								0.0323 (4)	0.0858 (4)	0.145	163
	April								0.033 (3)	0.0967 (3)	0.119	173
	May								0.0239 (9)	0.1207 (9)	0.116	169
	June								0.017 (5)	0.0701 (5)	0.121	166
	July								0.017 (5)	0.0576 (5)	0.128	165
	August	0.0595 (2)	0.0325 (2)						0.0246 (7)	0.0909 (7)	0.135	164
	September								0.0235 (8)	0.0601 (8)	0.137	165
	October								0.0367 (3)	0.0433 (3)	0.135	165
	November								0.0215 (4)	0.0778 (4)	0.135	165
	December								0.0303 (3)	0.1097 (3)	0.143	163
Cadmium (Cd)-Dissolved [µg/L]	January								0.01 (3)	0.00567 (3)	0.287	158
	February								0.01033 (3)	0.00633 (3)	0.313	158
	March	0.0054 (1)							0.01068 (4)	0.00597 (6)	0.285	163
	April								0.00803 (3)	0.00567 (3)	0.160	173
	May				0.005 (1)	0.0152 (1)			0.01126 (9)	0.00741 (9)	0.132	169
	June	0.005 (2)	0.005 (2)	0.01727 (3)			0.0113 (1)	0.012 (1)	0.01136 (7)	0.0072 (7)	0.156	166
	July	0.005 (1)	0.0229 (1)	0.0203 (2)					0.01216 (5)	0.00704 (5)	0.189	165
	August	10.0025 (2)	10.0025 (2)	0.024 (1)	0.005 (2)	0.0111 (1)		0.0171 (1)	0.01005 (8)	0.0071 (8)	0.225	164
	September	0.005 (1)	0.005 (1)	0.0246 (1)	0.005 (2)	0.005 (1)		0.005 (1)	0.01017 (9)	0.00669 (9)	0.242	165
	October	0.005 (4)	0.0057 (4)	0.02367 (3)	0.005 (2)	0.00965 (2)		0.0267 (1)	0.00933 (3)	0.008 (3)	0.234	165
	November		0.0057 (1)	0.0459 (1)	0.00683 (3)	0.0151 (1)			0.01008 (5)	0.00956 (5)	0.226	165
	December								0.01058 (4)	0.00723 (4)	0.255	163
Sulphate (SO4) [mg/L]	January								25.3 (3)	27.77 (3)	83.4	158
	February								25.73 (3)	28.07 (3)	87.8	158
	March	15.9 (1)							25.98 (4)	29.63 (6)	80.8	163
	April								24.47 (3)	22.53 (3)	54.4	173
	May				38.4 (1)	11.5 (1)			11.32 (9)	12.5 (9)	49.6	169
	June	22.2 (2)	28 (2)	2.13 (3)			7.83 (1)	5.25 (1)	11.57 (7)	13.1 (7)	54.8	166
	July	13.8 (1)	12.2 (1)	2.85 (2)					19.68 (5)	22.7 (5)	61.9	165
	August	15.55 (2)	18.25 (2)	2.47 (1)	36.95 (2)	30.8 (1)		7.39 (1)	23.74 (8)	23.85 (8)	69.2	164
	September	18 (1)	12.1 (1)	3.61 (1)	38.9 (2)	32.1 (1)		6.59 (1)	24.73 (9)	24.63 (9)	72.4	165
	October	18.46 (5)	26.28 (5)	3.35 (4)	38.7 (3)	31.6 (3)		7.98 (2)	25.73 (3)	25.53 (3)	70.8	165
	November		13.5 (1)	3.25 (1)	41.7 (3)	30.9 (1)			27.58 (5)	26.38 (5)	69.7	165
	December								24.48 (4)	26.8 (4)	76.8	163
Selenium (Se)-Dissolved [µg/L]	January								0.716 (3)	2.16 (3)	7.79	158
	February								0.44 (3)	2.213 (3)	8.15	158
	March	0.072 (1)							0.493 (4)	2.427 (6)	7.36	163
	April								0.62 (3)	1.595 (3)	4.46	173
	May				0.05 (1)	0.434 (1)			0.323 (9)	0.657 (9)	3.92	169
	June	0.089 (2)	0.05 (2)	0.108 (3)			1.21 (1)	0.126 (1)	0.326 (7)	0.711 (7)	4.51	166
	July	0.05 (1)	0.05 (1)	0.127 (2)					0.346 (5)	1.338 (5)	5.30	165
	August	0.344 (2)	0.125 (2)	0.194 (1)	0.117 (2)	1.22 (1)		0.127 (1)	0.573 (8)	1.544 (8)	6.10	164
	September	0.087 (1)	0.05 (1)	0.15 (1)	0.05 (2)	0.814 (1)		0.06 (1)	0.534 (9)	1.573 (9)	6.46	165
	October	0.237 (4)	0.075 (4)	0.125 (3)	0.162 (2)	1.296 (2)		0.134 (1)	0.89 (3)	1.399 (3)	6.28	165
	November		0.05 (1)	0.189 (1)	0.05 (3)	0.844 (1)			0.479 (5)	1.74 (5)	6.23	165
	December								0.442 (4)	2.2 (4)	7.09	163
Uranium (U)-Dissolved [µg/L]	January								0.133 (3)	0.083 (3)	0.517	158
	February								0.136 (3)	0.079 (3)	0.554	158
	March	0.67 (1)							0.148 (4)	0.0968 (6)	0.509	163
	April								0.1273 (3)	0.106 (3)	0.322	173
	May				0.58 (1)	0.27 (1)			0.1308 (9)	0.1177 (9)	0.283	169
	June	1.53 (2)	0.42 (2)	0.2733 (3)			0.22 (1)	0.1 (1)	0.1194 (7)	0.093 (7)	0.319	166

Grave Creek												
Parameter	Station ID	CM-11-11	CM-12-01	CM-13-06	GW-14-BR	GW-14-OB	GW-MD1	GW-PP2	G1	G2	Surface Water Quality - Predictions	
	Screened Unit	BR	BR	BR	BR	BR/OB - Till	BR	BR	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Arsenic (As)-D	July	1.42 (1)	0.12 (1)	0.265 (2)					0.1496 (5)	0.1058 (5)	0.370	165
	August	1.135 (2)	0.46 (2)	0.29 (1)	0.82 (2)	0.1 (1)		0.1 (1)	0.166 (8)	0.1145 (8)	0.423	164
	September	0.83 (1)	0.16 (1)	0.19 (1)	0.89 (2)	0.1 (1)		0.1 (1)	0.1554 (9)	0.1036 (9)	0.447	165
	October	0.675 (4)	0.555 (4)	0.25 (3)	1.055 (2)	0.1 (2)		0.1 (1)	0.1323 (3)	0.1043 (3)	0.435	165
	November		0.34 (1)	0.24 (1)	0.6567 (3)	0.1 (1)			0.1398 (5)	0.1052 (5)	0.424	165
	December								0.143 (4)	0.0985 (4)	0.470	163
Iron (Fe)-Dissolved [mg/L]	January								0.00373 (3)	0.00143 (3)	0.0105	158
	February								0.00583 (3)	0.001 (3)	0.0108	158
	March	0.011 (1)							0.0129 (4)	0.00553 (6)	0.0103	163
	April								0.008 (3)	0.0031 (3)	0.0085	173
	May				0.29 (1)	0.01 (1)			0.01893 (9)	0.00862 (9)	0.0082	169
	June	0.4595 (2)	0.1655 (2)	0.04767 (3)			0.01 (1)	0.01 (1)	0.0138 (7)	0.00964 (7)	0.0086	166
	July	0.796 (1)	0.018 (1)	0.0255 (2)					0.013 (5)	0.00452 (5)	0.0090	165
	August	0.695 (2)	0.147 (2)	0.026 (1)	0.352 (2)	0.01 (1)		0.01 (1)	0.0058 (8)	0.00456 (8)	0.0095	164
	September	0.29 (1)	0.079 (1)	0.063 (1)	0.4935 (2)	0.01 (1)		0.01 (1)	0.00581 (9)	0.00346 (9)	0.0097	165
	October	1.0966 (5)	0.2018 (5)	0.027 (4)	0.425 (3)	0.01667 (3)		0.02 (2)	0.0043 (3)	0.00353 (3)	0.0095	165
	November		0.118 (1)	0.024 (1)	0.17567 (3)	0.01 (1)			0.01668 (5)	0.32582 (5)	0.0095	165
	December								0.00753 (4)	0.00388 (4)	0.0100	163
Lithium (Li)-Dissolved [µg/L]	January								8.62 (3)	4.83 (3)	0.865	158
	February								10.15 (3)	4.86 (3)	0.860	158
	March	33.2 (1)							12.12 (4)	4.99 (6)	0.834	163
	April								9.58 (3)	5.11 (3)	0.808	173
	May				17.2 (1)	1.7 (1)			3.92 (9)	3.59 (9)	0.831	169
	June	34.7 (2)	15.35 (2)	1.67 (3)			1 (1)	4.3 (1)	3.62 (7)	3.36 (7)	0.837	166
	July	34.1 (1)	10.7 (1)	1.05 (2)					6.84 (5)	5.12 (5)	0.841	165
	August	20.75 (2)	18.4 (2)	1 (1)	20.55 (2)	12 (1)		4.7 (1)	9.12 (8)	6.11 (8)	0.840	164
	September	27.2 (1)	10.5 (1)	1 (1)	17.65 (2)	11.8 (1)		3.9 (1)	10.01 (9)	6.4 (9)	0.835	165
	October	25.33 (4)	14.7 (4)	1 (3)	19.05 (2)	11.5 (2)		5.8 (1)	8.2 (3)	6.3 (3)	0.831	165
	November		11.6 (1)	1 (1)	20.2 (3)	12 (1)			9.26 (5)	5.73 (5)	0.841	165
	December								9.39 (4)	5.25 (4)	0.860	163
Nickel (Ni)-Dissolved [µg/L]	January								0.218 (3)	0.074 (3)	37.8	158
	February								0.277 (3)	0.071 (3)	41.4	158
	March	0.76 (1)							0.338 (4)	0.298 (6)	37.5	163
	April								0.342 (3)	0.139 (3)	20.1	173
	May				0.5 (1)	0.78 (1)			0.447 (9)	0.259 (9)	16.2	169
	June	0.98 (2)	0.5 (2)	2.707 (3)			1.39 (1)	0.5 (1)	0.388 (7)	0.37 (7)	19.5	166
	July	0.93 (1)	0.54 (1)	2.785 (2)					0.477 (5)	0.228 (5)	24.3	165
	August	1.835 (2)	0.5 (2)	2.76 (1)	0.5 (2)	1.03 (1)		0.5 (1)	0.366 (8)	0.318 (8)	29.3	164
	September	1.73 (1)	0.5 (1)	2.74 (1)	0.5 (2)	0.5 (1)		0.5 (1)	0.33 (9)	0.203 (9)	31.6	165
	October	0.655 (4)	0.5 (4)	2.657 (3)	0.5 (2)	0.86 (2)		0.5 (1)	0.397 (3)	0.206 (3)	30.5	165
	November		0.51 (1)	2.79 (1)	0.657 (3)	0.64 (1)			0.523 (5)	0.276 (5)	29.2	165
	December								0.356 (4)	0.198 (4)	33.3	163
Cobalt (Co)-Dissolved [µg/L]	January								0.0097 (3)	0.006 (3)	14.5	158
	February								0.01 (3)	0.0073 (3)	15.9	158
	March	0.26 (1)							0.0343 (4)	0.0542 (6)	14.4	163
	April								0.016 (3)	0.0104 (3)	7.6	173
	May				0.17 (1)	0.1 (1)			0.029 (9)	0.0196 (9)	6.1	169
	June	0.38 (2)	0.1 (2)	0.18 (3)			0.1 (1)	0.1 (1)	0.0425 (7)	0.0388 (7)	7.4	166
	July	0.46 (1)	0.1 (1)	0.14 (2)					0.0369 (5)	0.0286 (5)	9.3	165
	August	0.565 (2)	0.2 (2)	0.14 (1)	0.195 (2)	0.1 (1)		0.1 (1)	0.0345 (8)	0.0323 (8)	11.2	164
	September	0.56 (1)	0.12 (1)	0.15 (1)	0.21 (2)	0.1 (1)		0.1 (1)	0.0239 (9)	0.0198 (9)	12.1	165
	October	0.24 (4)	0.1025 (4)	0.2067 (3)	0.245 (2)	0.15 (2)		0.1 (1)	0.0097 (3)	0.007 (3)	11.7	165
	November		0.11 (1)	0.29 (1)	0.24 (3)	0.1 (1)			0.0481 (5)	0.0451 (5)	11.2	165
	December								0.0338 (4)	0.0313 (4)	12.8	163
Sodium (Na)-Dissolved [mg/L]	January								3.933 (3)	2.173 (3)	0.246	158
	February								4.767 (3)	2.197 (3)	0.244	158
	March	32.8 (1)							5.605 (4)	2.17 (6)	0.237	163
	April								3.857 (3)	2.293 (3)	0.229	173
	May				9.28 (1)	6.32 (1)			1.646 (9)	1.75 (9)	0.236	169
	June	46.55 (2)	15.615 (2)	0.274 (3)			1.7 (1)	2.38 (1)	1.441 (7)	1.33 (7)	0.237	166
	July	42.8 (1)	4.65 (1)	1.375 (2)					2.726 (5)	1.904 (5)	0.238	165
	August	19.7 (2)	11.9 (2)	0.265 (1)	9.895 (2)	3.22 (1)		3.31 (1)	3.681 (8)	2.343 (8)	0.239	164
	September	27 (1)	5.56 (1)	0.261 (1)	9.61 (2)	3.06 (1)		2.04 (1)	4.069 (9)	2.501 (9)	0.237	165
	October	26.6 (5)	19.7 (5)	0.287 (4)	10.747 (3)	3.137 (3)		2.815 (2)	3.567 (3)	2.657 (3)	0.236	165
	November		7.07 (1)	0.408 (1)	12.633 (3)	3.27 (1)			4.072 (5)	2.514 (5)	0.239	165
	December								4.385 (4)	2.228 (4)	0.244	163

Grave Creek												
Parameter	Station ID	CM-11-11	CM-12-01	CM-13-06	GW-14-BR	GW-14-OB	GW-MD1	GW-PP2	G1	G2	Surface Water Quality - Predictions	
	Screened Unit	BR	BR	BR	BR	BR/OB - Till	BR	BR	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Manganese (Mn)-Dissolved [mg/L]	January								0.29 (3)	0.05 (3)	0.0276	158
	February								0.58 (3)	0.05 (3)	0.0302	158
	March	81.3 (1)							0.46 (4)	0.1 (6)	0.0274	163
	April								0.49 (3)	0.12 (3)	0.0149	173
	May				68.4 (1)	17.3 (1)			0.99 (9)	0.66 (9)	0.0121	169
	June	93.1 (2)	51.2 (2)	2.58 (3)			3.66 (1)	4.64 (1)	0.5 (7)	0.33 (7)	0.0145	166
	July	109 (1)	12.1 (1)	1.02 (2)					0.85 (5)	0.22 (5)	0.0178	165
	August	98.5 (2)	52.25 (2)	1.5 (1)	91.45 (2)	2.13 (1)		2.23 (1)	0.81 (8)	0.38 (8)	0.0214	164
	September	102 (1)	29.2 (1)	3.74 (1)	82.35 (2)	0.11 (1)		0.36 (1)	0.77 (9)	0.31 (9)	0.0231	165
	October	83.98 (5)	54.62 (5)	4.33 (4)	95.47 (3)	5.35 (3)		2.96 (2)	0.42 (3)	0.52 (3)	0.0223	165
	November		26.6 (1)	15.4 (1)	108.23 (3)	0.68 (1)			1.11 (5)	1.19 (5)	0.0215	165
	December								0.585 (4)	0.104 (4)	0.0245	163
Phosphorus (P)-Dissolved [mg/L]	January										0	158
	February										0	158
	March	0.05 (1)							0.05 (1)	0.05 (3)	0	163
	April										0	173
	May				0.05 (1)	0.05 (1)					0	169
	June	0.05 (2)	0.05 (2)	0.08433 (3)			0.05 (1)	0.05 (1)	0.05 (2)	0.05 (2)	0	166
	July	0.05 (1)	0.05 (1)	0.05 (2)					0.05 (1)	0.05 (1)	0	165
	August	0.075 (2)	0.075 (2)	0.05 (1)	0.05 (2)	0.05 (1)		0.05 (1)	0.05 (2)	0.05 (2)	0	164
	September	0.05 (1)	0.05 (1)	0.05 (1)	0.05 (2)	0.05 (1)		0.05 (1)	0.05 (1)	0.05 (1)	0	165
	October	0.05 (4)	0.05 (4)	0.05 (3)	0.05 (2)	0.05 (2)		0.05 (1)			0	165
	November		0.05 (1)	0.05 (1)	0.05 (3)	0.05 (1)			0.05 (2)	0.05 (2)	0	165
	December								0.05 (1)	0.05 (1)	0	163
Phosphorus [mg/L]	January								0.03123 (3)	0.00523 (3)		
	February								0.029 (3)	0.005 (3)		
	March								0.0274 (4)	0.0102 (6)		
	April								0.0405 (3)	0.00837 (3)		
	May								0.11538 (9)	0.11742 (9)		
	June								0.06826 (7)	0.03146 (7)		
	July								0.02806 (5)	0.0095 (5)		
	August								0.0236 (8)	0.00838 (8)		
	September								0.02803 (9)	0.00769 (9)		
	October								0.01867 (3)	0.0098 (3)		
	November								0.03478 (5)	0.00762 (5)		
	December								0.02108 (4)	0.0045 (4)		

Note: The number in parenthesis correspond to the number of water quality results for the respective parameter

West Alexander Creek														
Parameter	Station ID	CM-13-25	GW-12-BR	GW-7-A	GW-7-B	GW-9-BR	GW-9-OB	GW-MD2	GW-MP1-BR	GW-MP1-OB	GW-MP1-PW	WA1	Surface Water Quality - Predictions	
	Screened Unit	BR	BR	OB - GF	OB - Till	BR	OB - Coll	OB/BR	BR	OB - FL	OB - Till	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Nitrate (as N) [mg/L]	January													158
	February													158
	March			0.0905 (2)			0.0773 (3)		0.005 (1)	0.2515 (2)	0.1109 (2)	0.0722 (2)		163
	April													173
	May			0.0703 (1)		0.0088 (1)	0.0982 (1)			0.244 (1)	0.351 (1)			169
	June	0.022 (2)	0.0154 (1)					0.0058 (1)	0.025 (1)			0.0404 (1)		166
	July	0.005 (1)												165
	August	0.441 (1)		0.108 (1)		0.0357 (2)	0.0957 (3)	0.415 (1)	0.007 (2)	0.141 (2)	0.2055 (2)	0.0186 (2)		164
	September	0.0262 (1)		0.6605 (2)		0.005 (1)	0.0868 (1)	0.0126 (1)	0.0064 (1)	0.295 (1)	0.154 (1)	0.0088 (1)		165
	October	0.0366 (4)		0.316 (2)		0.0103 (3)	0.1143 (2)	0.0313 (2)	0.0376 (2)	0.194 (2)	0.203 (2)			165
	November			0.1082 (2)	0.0498 (1)			0.027 (2)				0.0498 (1)		165
	December											0.0829 (1)		163
Nitrate (as NO3-) [mg/L]	January											0.0867 (3)	0.149	158
	February											0.0595 (2)	0.154	158
	March											0.0545 (2)	0.145	163
	April											0.0803 (3)	0.119	173
	May											0.0881 (9)	0.116	169
	June											0.0444 (6)	0.121	166
	July											0.0205 (5)	0.128	165
	August	0.056 (2)										0.029 (7)	0.135	164
	September											0.0219 (8)	0.137	165
	October											0.0357 (3)	0.135	165
	November											0.0612 (4)	0.135	165
	December											0.07 (2)	0.143	163
Cadmium (Cd)-Dissolved [µg/L]	January											0.00533 (3)	0.287	158
	February											0.006 (2)	0.313	158
	March			0.00925 (2)			0.0057 (3)		0.005 (1)	0.00885 (2)	0.0068 (2)	0.00678 (4)	0.285	163
	April											0.00533 (3)	0.160	173
	May			0.005 (1)		0.005 (1)	0.005 (1)			0.005 (1)	0.005 (1)	0.00667 (9)	0.132	169
	June	0.005 (2)	0.0386 (1)					0.005 (1)	0.005 (1)			0.00789 (8)	0.156	166
	July	0.005 (1)										0.00734 (5)	0.189	165
	August	20.0074 (2)		0.005 (1)		0.005 (2)	0.005 (3)	0.005 (1)	0.005 (2)	0.00765 (2)	0.0057 (2)	0.00706 (8)	0.225	164
	September	0.0083 (1)		0.005 (2)		0.005 (1)	0.005 (1)	0.005 (1)	0.005 (1)	0.0068 (1)	0.005 (1)	0.00733 (9)	0.242	165
	October	0.00915 (4)		0.0073 (2)		0.005 (3)	0.00725 (2)	0.005 (2)	0.005 (2)	0.009 (2)	0.007 (2)	0.006 (3)	0.234	165
	November			0.0092 (2)				0.005 (2)				0.00618 (5)	0.226	165
	December											0.00647 (3)	0.255	163
Sulphate (SO4) [mg/L]	January											19.97 (3)	83.4	158
	February											19.15 (2)	87.8	158
	March			16 (2)			30.3 (3)		15.5 (1)	18.65 (2)	20 (2)	20.15 (4)	80.8	163
	April											15.77 (3)	54.4	173
	May			18.9 (1)		37.2 (1)	24.1 (1)			7.73 (1)	5.85 (1)	11.16 (9)	49.6	169
	June	7.37 (2)	4.84 (1)					27.6 (1)	9 (1)			10.39 (8)	54.8	166
	July	10.9 (1)										16.34 (5)	61.9	165
	August	11.6 (2)		14.9 (1)		36.25 (2)	23.7 (3)	26.2 (1)	12.15 (2)	11.45 (2)	11.95 (2)	18.34 (8)	69.2	164
	September	11.4 (1)		16.8 (2)		38 (1)	25.2 (1)	28.8 (1)	15.6 (1)	12.7 (1)	15.8 (1)	18.17 (9)	72.4	165
	October	10.31 (4)		16.15 (2)		37.3 (3)	25.5 (2)	27.95 (2)	12.65 (2)	14.84 (2)	15.85 (2)	19.63 (3)	70.8	165
	November			16.25 (2)	97.1 (1)			25.7 (2)				18.38 (5)	69.7	165
	December											18.77 (3)	76.8	163
Selenium (Se)-Dissolved [µg/L]	January											0.668 (3)	7.79	158
	February											0.64 (2)	8.15	158
	March			0.623 (2)			0.724 (3)		0.05 (1)	0.749 (2)	0.803 (2)	0.716 (4)	7.36	163
	April											0.663 (3)	4.46	173
	May			0.696 (1)		0.673 (1)	1.01 (1)			0.362 (1)	0.301 (1)	0.434 (9)	3.92	169
	June	0.05 (2)	0.308 (1)					0.05 (1)	0.05 (1)			0.41 (8)	4.51	166
	July	0.05 (1)										0.511 (5)	5.30	165
	August	0.225 (2)		0.725 (1)		0.39 (2)	1.008 (3)	0.05 (1)	0.05 (2)	0.498 (2)	0.489 (2)	0.567 (8)	6.10	164
	September	0.081 (1)		0.557 (2)		0.84 (1)	0.908 (1)	0.115 (1)	0.17 (1)	0.445 (1)	0.466 (1)	0.561 (9)	6.46	165
	October	0.141 (4)		0.699 (2)		0.652 (3)	1.11 (2)	0.243 (2)	0.05 (2)	0.506 (2)	0.624 (2)	0.589 (3)	6.28	165
	November			0.803 (2)				0.053 (2)				0.641 (5)	6.23	165
	December											0.678 (3)	7.09	163
Arsenic (As)-Dissolved [µg/L]	January											0.1277 (3)	0.517	158
	February											0.1225 (2)	0.554	158
	March			0.18 (2)			0.12 (3)		0.41 (1)	0.155 (2)	0.21 (2)	0.1285 (4)	0.509	163
	April											0.1263 (3)	0.322	173
	May			0.14 (1)		0.1 (1)	0.1 (1)			0.13 (1)	0.11 (1)	0.1434 (9)	0.283	169
	June	1.54 (2)	0.28 (1)					0.16 (1)	0.72 (1)			0.149 (8)	0.319	166
	July	1.69 (1)										0.1412 (5)	0.370	165
	August	0.58 (2)		0.15 (1)		0.1 (2)	0.1 (3)	0.16 (1)	0.465 (2)	0.115 (2)	0.125 (2)	0.1449 (8)	0.423	164
	September	0.48 (1)		0.105 (2)		0.1 (1)	0.1 (1)	0.13 (1)	0.3 (1)	0.1 (1)	0.12 (1)	0.1366 (9)	0.447	165
	October	1.1075 (4)		0.115 (2)		0.1 (3)	0.1 (2)	0.195 (2)	0.415 (2)	0.13 (2)	0.115 (2)	0.1363 (3)	0.435	165
	November			0.16 (2)				0.25 (2)				0.1262 (5)	0.424	165
	December											0.1393 (3)	0.470	163
Iron (Fe)-Dissolved [mg/L]	January											0.00153 (3)	0.0105	158
	February											0.00135 (2)	0.0108	158
	March			0.012 (2)			0.01 (3)		0.032 (1)	0.01 (2)	0.01 (2)	0.0061 (4)	0.0103	163
	April											0.0048 (3)	0.0085	173
	May			0.01 (1)		0.294 (1)	0.01 (1)			0.01 (1)	0.01 (1)	0.00951 (9)	0.0082	169
	June	1.2725 (2)	0.022 (1)					0.023 (1)	0.01 (1)			0.01928 (8)	0.0086	166
	July	2.18 (1)										0.00744 (5)	0.0090	165
	August	0.0355 (2)		0.01 (1)		0.307 (2)	0.01 (3)	0.203 (1)	0.0205 (2)	0.01 (2)	0.01 (2)	0.00473 (8)	0.0095	164
	September	0.078 (1)		0.01 (2)		0.253 (1)	0.01 (1)	0.166 (1)	0.07 (1)	0.01 (1)	0.01 (1)	0.00511 (9)	0.0097	165

West Alexander Creek														
Parameter	Station ID	CM-13-25	GW-12-BR	GW-7-A	GW-7-B	GW-9-BR	GW-9-OB	GW-MD2	GW-MP1-BR	GW-MP1-OB	GW-MP1-PW	WA1	Surface Water Quality - Predictions	
	Screened Unit	BR	BR	OB - GF	OB - Till	BR	OB - Coll	OB/BR	BR	OB - FL	OB - Till	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Iron	October	0.9425 (4)		0.01 (2)		0.30033 (3)	0.01 (2)	0.151 (2)	0.0325 (2)	0.01 (2)	0.01 (2)	0.00207 (3)	0.0095	165
	November			0.01 (2)				0.1095 (2)				0.00542 (5)	0.0095	165
	December											0.00443 (3)	0.0100	163
Lithium (Li)-Dissolved [µg/L]	January											8.66 (3)	0.865	158
	February											9.04 (2)	0.860	158
	March			7.2 (2)			21.97 (3)		467 (1)	7.7 (2)	8.45 (2)	9.39 (4)	0.834	163
	April											7.68 (3)	0.808	173
	May			6.9 (1)		37.2 (1)	8.9 (1)			4.2 (1)	3.9 (1)	4.44 (9)	0.831	169
	June	12.35 (2)	2 (1)					15.5 (1)	545 (1)			4.13 (8)	0.837	166
	July	14.9 (1)										7.26 (5)	0.841	165
	August	13.3 (2)		8.3 (1)		45.7 (2)	10.5 (3)	16 (1)	504.5 (2)	6.2 (2)	6.25 (2)	8.76 (8)	0.840	164
	September	5.9 (1)		8.05 (2)		40.6 (1)	10 (1)	13.9 (1)	408 (1)	6.4 (1)	6.3 (1)	9.02 (9)	0.835	165
	October	9.9 (4)		8.15 (2)		45.83 (3)	11.45 (2)	14.95 (2)	530.5 (2)	7.45 (2)	7.45 (2)	8.39 (3)	0.831	165
	November			7.8 (2)				14.25 (2)				8.29 (5)	0.841	165
	December											8.2 (3)	0.860	163
Nickel (Ni)-Dissolved [µg/L]	January											0.116 (3)	37.8	158
	February											0.09 (2)	41.4	158
	March			0.5 (2)			0.643 (3)		0.5 (1)	0.5 (2)	0.5 (2)	0.306 (4)	37.5	163
	April											0.19 (3)	20.1	173
	May			0.5 (1)		0.5 (1)	0.5 (1)			0.5 (1)	0.5 (1)	0.324 (9)	16.2	169
	June	2.76 (2)	3.4 (1)					0.5 (1)	0.5 (1)			0.363 (8)	19.5	166
	July	2.68 (1)										0.244 (5)	24.3	165
	August	3.07 (2)		0.5 (1)		0.5 (2)	0.5 (3)	0.5 (1)	0.5 (2)	0.5 (2)	0.5 (2)	0.264 (8)	29.3	164
	September	2.24 (1)		0.5 (2)		0.5 (1)	0.5 (1)	0.5 (1)	0.5 (1)	0.5 (1)	0.5 (1)	0.183 (9)	31.6	165
	October	2.465 (4)		0.5 (2)		0.5 (3)	0.5 (2)	0.5 (2)	0.5 (2)	0.5 (2)	0.5 (2)	0.149 (3)	30.5	165
	November			0.5 (2)				0.5 (2)				0.309 (5)	29.2	165
	December											0.26 (3)	33.3	163
Cobalt (Co)-Dissolved [µg/L]	January											0.006 (3)	14.5	158
	February											0.008 (2)	15.9	158
	March			0.115 (2)			0.1 (3)		0.1 (1)	0.1 (2)	0.1 (2)	0.055 (4)	14.4	163
	April											0.0122 (3)	7.6	173
	May			0.1 (1)		0.17 (1)	0.1 (1)			0.1 (1)	0.1 (1)	0.0191 (9)	6.1	169
	June	1.2 (2)	1.06 (1)					0.1 (1)	0.1 (1)			0.0463 (8)	7.4	166
	July	1.22 (1)										0.0308 (5)	9.3	165
	August	1.625 (2)		0.1 (1)		0.11 (2)	0.1 (3)	0.1 (1)	0.1 (2)	0.1 (2)	0.1 (2)	0.0314 (8)	11.2	164
	September	1.66 (1)		0.1 (2)		0.14 (1)	0.1 (1)	0.1 (1)	0.1 (1)	0.1 (1)	0.1 (1)	0.0218 (9)	12.1	165
	October	0.9375 (4)		0.1 (2)		0.2333 (3)	0.1 (2)	0.1 (2)	0.1 (2)	0.1 (2)	0.1 (2)	0.012 (3)	11.7	165
	November			0.1 (2)				0.1 (2)				0.0458 (5)	11.2	165
	December											0.0377 (3)	12.8	163
Sodium (Na)-Dissolved [mg/L]	January											4.07 (3)	0.246	158
	February											4.03 (2)	0.244	158
	March			3.175 (2)			9.213 (3)		159 (1)	5.63 (2)	4.36 (2)	4.05 (4)	0.237	163
	April											3.243 (3)	0.229	173
	May			3.31 (1)		17.4 (1)	3.42 (1)			2.55 (1)	1.69 (1)	1.556 (9)	0.236	169
	June	3.445 (2)	1.97 (1)					4.6 (1)	217 (1)			1.495 (8)	0.237	166
	July	11.8 (1)										2.696 (5)	0.238	165
	August	8.45 (2)		3.02 (1)		18.35 (2)	3.633 (3)	4.29 (1)	177 (2)	2.795 (2)	2.35 (2)	3.42 (8)	0.239	164
	September	10.6 (1)		3.43 (2)		18.4 (1)	3.51 (1)	3.94 (1)	147 (1)	4.53 (1)	2.54 (1)	3.582 (9)	0.237	165
	October	7.193 (4)		3.165 (2)		18.7 (3)	3.815 (2)	4.29 (2)	168 (2)	5.175 (2)	2.945 (2)	3.573 (3)	0.236	165
	November			3.605 (2)				4.58 (2)				3.47 (5)	0.239	165
	December											3.827 (3)	0.244	163
Manganese (Mn)-Dissolved [mg/L]	January											0.14 (3)	0.0276	158
	February											0.08 (2)	0.0302	158
	March			10.06 (2)			13.83 (3)		18.6 (1)	0.4 (2)	0.12 (2)	0.15 (4)	0.0274	163
	April											0.28 (3)	0.0149	173
	May			1.09 (1)		54.3 (1)	0.68 (1)			0.25 (1)	0.42 (1)	0.54 (9)	0.0121	169
	June	46.4 (2)	56.7 (1)					77.8 (1)	14.1 (1)			0.98 (8)	0.0145	166
	July	61.2 (1)										0.43 (5)	0.0178	165
	August	92.32 (2)		1.06 (1)		49.05 (2)	0.36 (3)	78.6 (1)	15.05 (2)	0.24 (2)	0.18 (2)	0.26 (8)	0.0214	164
	September	20.2 (1)		0.1 (2)		46.5 (1)	0.1 (1)	73.7 (1)	12.7 (1)	0.28 (1)	0.1 (1)	0.42 (9)	0.0231	165
	October	33.55 (4)		0.1 (2)		46.63 (3)	0.25 (2)	76.5 (2)	12.5 (2)	0.16 (2)	0.14 (2)	0.32 (3)	0.0223	165
	November			9.47 (2)				70.75 (2)				0.29 (5)	0.0215	165
	December											0.123 (3)	0.0245	163
Phosphorus (P)-Dissolved [mg/L]	January												0	158
	February												0	158
	March			0.05 (2)			0.05 (3)		0.05 (1)	0.05 (2)	0.05 (2)	0.05 (2)	0	163
	April												0	173
	May			0.05 (1)		0.05 (1)	0.05 (1)			0.05 (1)	0.05 (1)		0	169
	June	0.05 (2)	0.05 (1)					0.05 (1)	0.059 (1)			0.05 (2)	0	166
	July	0.05 (1)										0.05 (1)	0	165
	August	0.075 (2)		0.05 (1)		0.05 (2)	0.05 (3)	0.05 (1)	0.05 (2)	0.05 (2)	0.05 (2)	0.05 (2)	0	164
	September	0.05 (1)		0.0825 (2)		0.05 (1)	0.05 (1)	0.05 (1)	0.05 (1)	0.05 (1)	0.05 (1)	0.05 (1)	0	165
	October	0.05 (4)		0.05 (2)		0.05 (3)	0.05 (2)	0.05 (2)	0.05 (2)	0.05 (2)	0.05 (2)		0	165
	November			0.05 (2)				0.05 (2)				0.05 (2)	0	165
	December											0.05 (1)	0	163
[illegible]us [mg/L]	January											0.01967 (3)		
	February											0.0184 (2)		
	March											0.03183 (4)		
	April											0.02757 (3)		
	May											0.07416 (9)		
	June											0.4437 (8)		

West Alexander Creek														
Parameter	Station ID	CM-13-25	GW-12-BR	GW-7-A	GW-7-B	GW-9-BR	GW-9-OB	GW-MD2	GW-MP1-BR	GW-MP1-OB	GW-MP1-PW	WA1	Surface Water Quality - Predictions	
	Screened Unit	BR	BR	OB - GF	OB - Till	BR	OB - Coll	OB/BR	BR	OB - FL	OB - Till	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Phosphor	July											0.02098 (5)		
	August											0.018 (8)		
	September											0.01892 (9)		
	October											0.018 (3)		
	November											0.03194 (5)		
	December											0.02093 (3)		

Note: The number in parenthesis correspond to the number of water quality results for the respective parameter

Alexander Creek										
Parameter	Station ID	GW-1-A	GW-1-B	GW-3-A	GW-3-B	GW-3-C	A3	A3 (B)	Surface Water Quality - Predictions	
	Screened Unit	OB - GL	OB - FL	OB - GF	OB - GF	OB - FL/GF	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Nitrate (as N) [mg/L]	January									158
	February									158
	March	0.005 (2)	0.005 (3)	0.005 (2)	0.005 (2)	0.1635 (2)		0.0642 (1)		163
	April									173
	May	0.005 (2)	0.005 (2)	0.005 (2)	0.0609 (3)	0.0858 (2)				169
	June									166
	July									165
	August	0.0291 (1)	0.0169 (1)	0.145 (1)	0.319 (1)	0.165 (1)		0.0233 (1)		164
	September	0.0143 (2)	0.005 (2)	0.005 (2)	0.0465 (2)	0.12 (2)		0.0705 (1)		165
	October	0.0064 (1)	0.0356 (1)	0.02 (1)	0.1 (1)	0.102 (1)				165
	November	0.0053 (2)	0.0285 (2)	0.005 (3)	0.0142 (3)	0.1335 (2)	0.0748 (1)	0.0967 (1)		165
	December									163
Nitrate (as NO3-) [mg/L]	January						0.087 (2)	0.08 (1)	0.149	158
	February							0.103 (1)	0.154	158
	March							0.0864 (2)	0.145	163
	April						0.08 (2)	0.087 (1)	0.119	173
	May						0.1476 (5)	0.0375 (4)	0.116	169
	June						0.056 (3)	0.043 (2)	0.121	166
	July						0.0235 (2)	0.0283 (3)	0.128	165
	August						0.02 (2)	0.0598 (5)	0.135	164
	September						0.0205 (2)	0.0647 (6)	0.137	165
	October						0.021 (2)	0.045 (1)	0.135	165
	November						0.0595 (2)	0.085 (1)	0.135	165
	December						0.058 (1)	0.087 (1)	0.143	163
Cadmium (Cd)-Dissolved [µg/L]	January						0.0065 (2)	0.005 (1)	0.287	158
	February							0.005 (1)	0.313	158
	March	0.00525 (2)	0.01747 (3)	0.005 (2)	0.005 (2)	0.00605 (2)		0.005 (3)	0.285	163
	April						0.0055 (2)	0.0054 (1)	0.160	173
	May	0.005 (2)	0.005 (2)	0.005 (2)	0.005 (3)	0.005 (2)	0.0076 (5)	0.0081 (4)	0.132	169
	June						0.01 (4)	0.00685 (2)	0.156	166
	July						0.0085 (2)	0.0056 (3)	0.189	165
	August	0.005 (1)	0.005 (1)	0.005 (1)	0.005 (1)	0.005 (1)	0.0085 (2)	0.00512 (5)	0.225	164
	September	0.005 (2)	0.005 (2)	0.005 (2)	0.0438 (2)	0.006 (2)	0.0105 (2)	0.00557 (7)	0.242	165
	October	0.005 (1)	0.005 (1)	0.005 (1)	0.005 (1)	0.005 (1)	0.008 (2)	0.005 (1)	0.234	165
	November	0.0061 (2)	0.00885 (2)	0.0095 (3)	0.00707 (3)	0.00585 (2)	0.0062 (3)	0.0064 (2)	0.226	165
	December						0.005 (1)	0.005 (1)	0.255	163
Sulphate (SO4) [mg/L]	January						20.1 (2)	19 (1)	83.4	158
	February							19.9 (1)	87.8	158
	March	29.55 (2)	19.5 (3)	14.53 (2)	21.75 (2)	34.25 (2)		20.9 (3)	80.8	163
	April						18.4 (2)	10.2 (1)	54.4	173
	May	32.75 (2)	20.15 (2)	16.75 (2)	24.97 (3)	8.04 (2)	9.23 (5)	8.64 (4)	49.6	169
	June						7.33 (4)	7.73 (2)	54.8	166
	July						13.8 (2)	14.33 (3)	61.9	165
	August	31.7 (1)	20 (1)	9.06 (1)	25.7 (1)	9.4 (1)	17.4 (2)	15.18 (5)	69.2	164
	September	32.35 (2)	21.05 (2)	4.88 (2)	26.45 (2)	13.6 (2)	18 (2)	16.51 (7)	72.4	165
	October	36.4 (1)	21.9 (1)	0.8 (1)	22.4 (1)	9.41 (1)	19.5 (2)	19.3 (1)	70.8	165
	November	32.6 (2)	19.8 (2)	20.7 (3)	22.67 (3)	24.5 (2)	18.2 (3)	19.3 (2)	69.7	165
	December						17.9 (1)	17.8 (1)	76.8	163
ed [µg/L]	January						0.718 (2)	0.622 (1)	7.79	158
	February							0.582 (1)	8.15	158
	March	0.064 (2)	0.319 (3)	0.283 (2)	0.37 (2)	1.225 (2)		0.632 (3)	7.36	163
	April						0.738 (2)	0.425 (1)	4.46	173

Alexander Creek										
Parameter	Station ID	GW-1-A	GW-1-B	GW-3-A	GW-3-B	GW-3-C	A3	A3 (B)	Surface Water Quality - Predictions	
	Screened Unit	OB - GL	OB - FL	OB - GF	OB - GF	OB - FL/GF	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Selenium (Se)-Dissolv	May	3.775 (2)	0.327 (2)	1.709 (2)	1.89 (3)	0.366 (2)	0.392 (5)	0.333 (4)	3.92	169
	June						0.356 (4)	0.295 (2)	4.51	166
	July						0.569 (2)	0.501 (3)	5.30	165
	August	0.528 (1)	0.14 (1)	1.05 (1)	0.233 (1)	0.551 (1)	0.571 (2)	0.553 (5)	6.10	164
	September	1.14 (2)	0.104 (2)	3.825 (2)	2.04 (2)	0.461 (2)	0.597 (2)	0.633 (7)	6.46	165
	October	0.05 (1)	0.41 (1)	0.515 (1)	4.02 (1)	0.343 (1)	0.615 (2)	0.646 (1)	6.28	165
	November	0.08 (2)	0.295 (2)	0.112 (3)	0.332 (3)	1.115 (2)	0.632 (3)	0.699 (2)	6.23	165
	December						0.679 (1)	0.586 (1)	7.09	163
Arsenic (As)-Dissolved [µg/L]	January						0.1345 (2)	0.097 (1)	0.517	158
	February							0.072 (1)	0.554	158
	March	1.135 (2)	0.7367 (3)	0.575 (2)	0.1 (2)	0.145 (2)		0.0983 (3)	0.509	163
	April						0.136 (2)	0.109 (1)	0.322	173
	May	1.34 (2)	0.78 (2)	0.66 (2)	0.1033 (3)	0.145 (2)	0.15 (5)	0.111 (4)	0.283	169
	June						0.1558 (4)	0.116 (2)	0.319	166
	July						0.143 (2)	0.1153 (3)	0.370	165
	August	1.12 (1)	1.02 (1)	0.67 (1)	0.11 (1)	0.13 (1)	0.148 (2)	0.1018 (5)	0.423	164
	September	1.06 (2)	0.77 (2)	0.585 (2)	0.1 (2)	0.12 (2)	0.127 (2)	0.1054 (7)	0.447	165
	October	1.35 (1)	0.27 (1)	1.15 (1)	0.1 (1)	0.14 (1)	0.131 (2)	0.1 (1)	0.435	165
	November	1.63 (2)	0.745 (2)	0.67 (3)	0.1133 (3)	0.14 (2)	0.1343 (3)	0.107 (2)	0.424	165
	December						0.132 (1)	0.097 (1)	0.470	163
Iron (Fe)-Dissolved [mg/L]	January						0.00145 (2)	0.001 (1)	0.0105	158
	February							0.001 (1)	0.0108	158
	March	0.0205 (2)	0.01 (3)	0.0135 (2)	0.01 (2)	0.01 (2)		0.00733 (3)	0.0103	163
	April						0.00225 (2)	0.0038 (1)	0.0085	173
	May	0.0865 (2)	0.121 (2)	0.2555 (2)	0.01167 (3)	0.01 (2)	0.01308 (5)	0.00573 (4)	0.0082	169
	June						0.05843 (4)	0.00325 (2)	0.0086	166
	July						0.0086 (2)	0.00437 (3)	0.0090	165
	August	0.058 (1)	0.084 (1)	0.01 (1)	0.052 (1)	0.01 (1)	0.0027 (2)	0.00454 (5)	0.0095	164
	September	0.151 (2)	0.0975 (2)	0.0115 (2)	0.024 (2)	0.01 (2)	0.00485 (2)	0.00269 (7)	0.0097	165
	October	0.377 (1)	0.01 (1)	0.03 (1)	0.03 (1)	0.03 (1)	0.00215 (2)	0.0011 (1)	0.0095	165
	November	0.06 (2)	0.091 (2)	0.25367 (3)	0.01367 (3)	0.01 (2)	0.00467 (3)	0.006 (2)	0.0095	165
	December						0.0021 (1)	0.0015 (1)	0.0100	163
Lithium (Li)-Dissolved [µg/L]	January						8.52 (2)	2.36 (1)	0.865	158
	February							2.46 (1)	0.860	158
	March	16.25 (2)	5.5 (3)	8.8 (2)	5.5 (2)	1.2 (2)		2.36 (3)	0.834	163
	April						9.3 (2)	1.83 (1)	0.808	173
	May	16.9 (2)	5.6 (2)	9.1 (2)	5.43 (3)	1.1 (2)	3.86 (5)	1.97 (4)	0.831	169
	June						3.06 (4)	1.53 (2)	0.837	166
	July						6.11 (2)	2.2 (3)	0.841	165
	August	18.4 (1)	6.6 (1)	8.5 (1)	5.2 (1)	1 (1)	8.31 (2)	2.4 (5)	0.840	164
	September	17 (2)	5.7 (2)	8.8 (2)	5.2 (2)	1.25 (2)	9.06 (2)	2.23 (7)	0.835	165
	October	19 (1)	6.5 (1)	9.9 (1)	5.7 (1)	1.7 (1)	8.02 (2)	2.14 (1)	0.831	165
	November	17.1 (2)	5.4 (2)	9.3 (3)	5.23 (3)	1.4 (2)	8.31 (3)	2.63 (2)	0.841	165
	December						8.55 (1)	2.16 (1)	0.860	163
(Ni)-Dissolved [µg/L]	January						0.118 (2)	0.07 (1)	37.8	158
	February							0.059 (1)	41.4	158
	March	0.745 (2)	0.887 (3)	0.52 (2)	0.5 (2)	0.5 (2)		0.36 (3)	37.5	163
	April						0.172 (2)	0.191 (1)	20.1	173
	May	0.5 (2)	0.655 (2)	0.5 (2)	0.5 (3)	0.5 (2)	0.301 (5)	0.24 (4)	16.2	169
	June						0.357 (4)	0.252 (2)	19.5	166
	July						0.24 (2)	0.252 (3)	24.3	165
	August	0.5 (1)	0.82 (1)	0.5 (1)	0.5 (1)	0.5 (1)	0.176 (2)	0.185 (5)	29.3	164

Alexander Creek										
Parameter	Station ID	GW-1-A	GW-1-B	GW-3-A	GW-3-B	GW-3-C	A3	A3 (B)	Surface Water Quality - Predictions	
	Screened Unit	OB - GL	OB - FL	OB - GF	OB - GF	OB - FL/GF	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Nickel (	September	0.5 (2)	0.5 (2)	0.5 (2)	0.5 (2)	0.5 (2)	0.172 (2)	0.166 (7)	31.6	165
	October	0.5 (1)	0.5 (1)	0.5 (1)	0.5 (1)	0.5 (1)	0.176 (2)	0.536 (1)	30.5	165
	November	0.54 (2)	0.61 (2)	0.567 (3)	0.5 (3)	0.5 (2)	0.253 (3)	0.384 (2)	29.2	165
	December						0.158 (1)	0.143 (1)	33.3	163
Cobalt (Co)-Dissolved [µg/L]	January						0.0055 (2)	0.005 (1)	14.5	158
	February							0.007 (1)	15.9	158
	March	0.265 (2)	0.1933 (3)	0.14 (2)	0.115 (2)	0.1 (2)		0.0694 (3)	14.4	163
	April						0.011 (2)	0.0135 (1)	7.6	173
	May	0.125 (2)	0.14 (2)	0.11 (2)	0.1 (3)	0.1 (2)	0.0224 (5)	0.0185 (4)	6.1	169
	June						0.0329 (4)	0.0105 (2)	7.4	166
	July						0.0165 (2)	0.0389 (3)	9.3	165
	August	0.11 (1)	0.14 (1)	0.1 (1)	0.11 (1)	0.1 (1)	0.0125 (2)	0.0264 (5)	11.2	164
	September	0.1 (2)	0.11 (2)	0.1 (2)	0.1 (2)	0.1 (2)	0.01 (2)	0.0209 (7)	12.1	165
	October	0.1 (1)	0.1 (1)	0.1 (1)	0.1 (1)	0.1 (1)	0.014 (2)	0.006 (1)	11.7	165
	November	0.205 (2)	0.16 (2)	0.14 (3)	0.1267 (3)	0.1 (2)	0.0397 (3)	0.0618 (2)	11.2	165
	December						0.009 (1)	0.005 (1)	12.8	163
Sodium (Na)-Dissolved [mg/L]	January						3.925 (2)	0.926 (1)	0.246	158
	February							0.984 (1)	0.244	158
	March	23.6 (2)	2.593 (3)	5.375 (2)	2.035 (2)	0.731 (2)		0.912 (3)	0.237	163
	April						3.86 (2)	0.899 (1)	0.229	173
	May	28.25 (2)	2.47 (2)	3.885 (2)	1.537 (3)	0.534 (2)	1.378 (5)	0.794 (4)	0.236	169
	June						1.032 (4)	0.657 (2)	0.237	166
	July						2.18 (2)	0.833 (3)	0.238	165
	August	23.7 (1)	2.6 (1)	4.4 (1)	1.85 (1)	0.636 (1)	3.3 (2)	0.827 (5)	0.239	164
	September	24.55 (2)	2.305 (2)	4.855 (2)	1.46 (2)	0.667 (2)	3.53 (2)	0.777 (7)	0.237	165
	October	26.6 (1)	2.33 (1)	5.12 (1)	1.06 (1)	0.446 (1)	3.44 (2)	0.814 (1)	0.236	165
	November	28.1 (2)	2.885 (2)	5.463 (3)	1.703 (3)	2.218 (2)	3.373 (3)	0.805 (2)	0.239	165
	December						3.74 (1)	0.857 (1)	0.244	163
Manganese (Mn)-Dissolved [mg/L]	January						0.14 (2)	0.05 (1)	0.0276	158
	February							0.26 (1)	0.0302	158
	March	114.5 (2)	36.03 (3)	88.8 (2)	281 (2)	0.62 (2)		0.1 (3)	0.0274	163
	April						0.2 (2)	0.34 (1)	0.0149	173
	May	119 (2)	46.75 (2)	127 (2)	71.92 (3)	0.33 (2)	0.55 (5)	0.73 (4)	0.0121	169
	June						1.24 (4)	0.26 (2)	0.0145	166
	July						0.63 (2)	0.2 (3)	0.0178	165
	August	128 (1)	64.4 (1)	89.1 (1)	245 (1)	0.86 (1)	0.27 (2)	0.27 (5)	0.0214	164
	September	142.5 (2)	46.7 (2)	82.1 (2)	89.05 (2)	0.36 (2)	0.33 (2)	0.2 (7)	0.0231	165
	October	176 (1)	9.1 (1)	126 (1)	5 (1)	5 (1)	1.01 (2)	0.16 (1)	0.0223	165
	November	140.5 (2)	44.75 (2)	139.67 (3)	194 (3)	2.31 (2)	0.26 (3)	0.21 (2)	0.0215	165
	December						0.175 (1)	0.084 (1)	0.0245	163
Phosphorus (P)-Dissolved [mg/L]	January								0	158
	February								0	158
	March	0.05 (2)	0.05 (3)	0.05 (2)	0.05 (2)	0.05 (2)		0.05 (2)	0	163
	April								0	173
	May	0.05 (2)	0.05 (2)	0.05 (2)	0.05 (3)	0.05 (2)			0	169
	June								0	166
	July							0.05 (1)	0	165
	August	0.05 (1)	0.05 (1)	0.05 (1)	0.05 (1)	0.05 (1)		0.05 (1)	0	164
	September	0.05 (2)	0.05 (2)	0.05 (2)	0.05 (2)	0.05 (2)		0.05 (1)	0	165
	October	0.05 (1)	0.05 (1)	0.05 (1)	0.05 (1)	0.05 (1)			0	165
	November	0.05 (2)	0.05 (2)	0.05 (3)	0.05 (3)	0.05 (2)	0.05 (1)	0.05 (1)	0	165
	December								0	163

Alexander Creek										
Parameter	Station ID	GW-1-A	GW-1-B	GW-3-A	GW-3-B	GW-3-C	A3	A3 (B)	Surface Water Quality - Predictions	
	Screened Unit	OB - GL	OB - FL	OB - GF	OB - GF	OB - FL/GF	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Phosphorus [mg/L]	January						0.0223 (2)	0.005 (1)		
	February							0.005 (1)		
	March							0.0141 (3)		
	April						0.02055 (2)	0.0188 (1)		
	May						0.10808 (5)	0.01833 (4)		
	June						0.7786 (4)	0.01615 (2)		
	July						0.02265 (2)	0.00487 (3)		
	August						0.01935 (2)	0.00574 (5)		
	September						0.01905 (2)	0.00679 (7)		
	October						0.0168 (2)	0.005 (1)		
	November						0.02403 (3)	0.0056 (2)		
	December						0.0269 (1)	0.005 (1)		

Note: The number in parenthesis correspond to the number of water quality results for the respective parameter

East Alexander Creek									
Parameter	Station ID	GW-4-BR	GW-4-OB	GW-6-BR	GW-6-OB	A4	A5	Surface Water Quality - Predictions	
	Screened Unit	BR	OB - Till	BR	OB - FL	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Nitrate (as N) [mg/L]	January								158
	February								158
	March	0.005 (2)			0.0174 (2)	0.0678 (2)	0.0822 (2)		163
	April								173
	May	0.0061 (3)	0.0845 (1)						169
	June			0.037 (1)	0.0147 (2)	0.0637 (1)	0.0119 (1)		166
	July								165
	August	0.09 (1)	0.554 (1)	0.041 (1)	0.005 (1)	0.1129 (2)	0.0224 (2)		164
	September	0.0066 (2)	0.0587 (1)	0.065 (1)	0.0738 (1)	0.13 (1)	0.0723 (1)		165
	October	0.02 (1)	0.04 (1)	0.166 (2)	0.1005 (2)				165
	November	0.0177 (2)	0.0322 (1)	0.016 (1)	0.0307 (1)	0.145 (1)			165
	December					0.137 (1)	0.114 (1)		163
Nitrate (as NO3-) [mg/L]	January					0.092 (3)	0.0937 (3)	0.149	158
	February					0.101 (2)	0.0843 (3)	0.154	158
	March					0.0857 (4)	0.0855 (4)	0.145	163
	April					0.139 (2)	0.0767 (3)	0.119	173
	May					0.0532 (9)	0.035 (8)	0.116	169
	June					0.0612 (5)	0.0228 (6)	0.121	166
	July					0.068 (5)	0.0252 (5)	0.128	165
	August					0.1505 (6)	0.0421 (7)	0.135	164
	September					0.1126 (8)	0.0425 (8)	0.137	165
	October					0.114 (2)	0.045 (3)	0.135	165
	November					0.0974 (4)	0.0809 (4)	0.135	165
	December					0.105 (2)	0.0937 (3)	0.143	163
Cadmium (Cd)-Dissolved [µg/L]	January					0.007 (3)	0.00533 (3)	0.287	158
	February					0.0075 (2)	0.00633 (3)	0.313	158
	March	0.005 (2)			0.005 (2)	0.0066 (6)	0.00583 (6)	0.285	163
	April					0.0086 (2)	0.00507 (3)	0.160	173
	May	0.005 (3)	0.005 (1)			0.01021 (9)	0.00661 (8)	0.132	169
	June			0.005 (1)	0.005 (2)	0.00983 (7)	0.00706 (8)	0.156	166
	July					0.00832 (5)	0.01008 (5)	0.189	165
	August	0.005 (1)	0.014 (1)	0.005 (1)	0.0106 (1)	0.00724 (7)	0.00639 (8)	0.225	164
	September	0.005 (2)	0.0108 (1)	0.005 (1)	0.005 (1)	0.00756 (9)	0.00586 (9)	0.242	165
	October	0.005 (1)	0.0082 (1)	0.0067 (2)	0.005 (2)	0.0075 (2)	0.01367 (3)	0.234	165
	November	0.0076 (2)	0.0264 (1)	0.005 (1)	0.0056 (1)	0.0075 (5)	0.0055 (4)	0.226	165
	December					0.007 (3)	0.00778 (4)	0.255	163
Sulphate (SO4) [mg/L]	January					29.73 (3)	26.33 (3)	83.4	158
	February					34.15 (2)	27.8 (3)	87.8	158
	March	109.5 (2)			5.18 (2)	37.75 (6)	29.55 (6)	80.8	163
	April					18.06 (2)	18.32 (3)	54.4	173
	May	117.67 (3)	31.1 (1)			6.12 (9)	6.13 (8)	49.6	169
	June			166 (1)	4.06 (2)	5.38 (7)	5.17 (8)	54.8	166
	July					15.3 (5)	13.06 (5)	61.9	165
	August	131 (1)	16.4 (1)	229 (1)	3.55 (1)	21.41 (7)	18.38 (8)	69.2	164
	September	104.8 (2)	15.3 (1)	88.7 (1)	15.2 (1)	22.37 (9)	19.19 (9)	72.4	165
	October	67.7 (1)	12.5 (1)	100.4 (2)	8.49 (2)	24.2 (2)	21.5 (3)	70.8	165
	November	101.4 (2)	20.9 (1)	96.1 (1)	10.7 (1)	25.78 (5)	23.18 (4)	69.7	165
	December					30.1 (3)	25.03 (4)	76.8	163

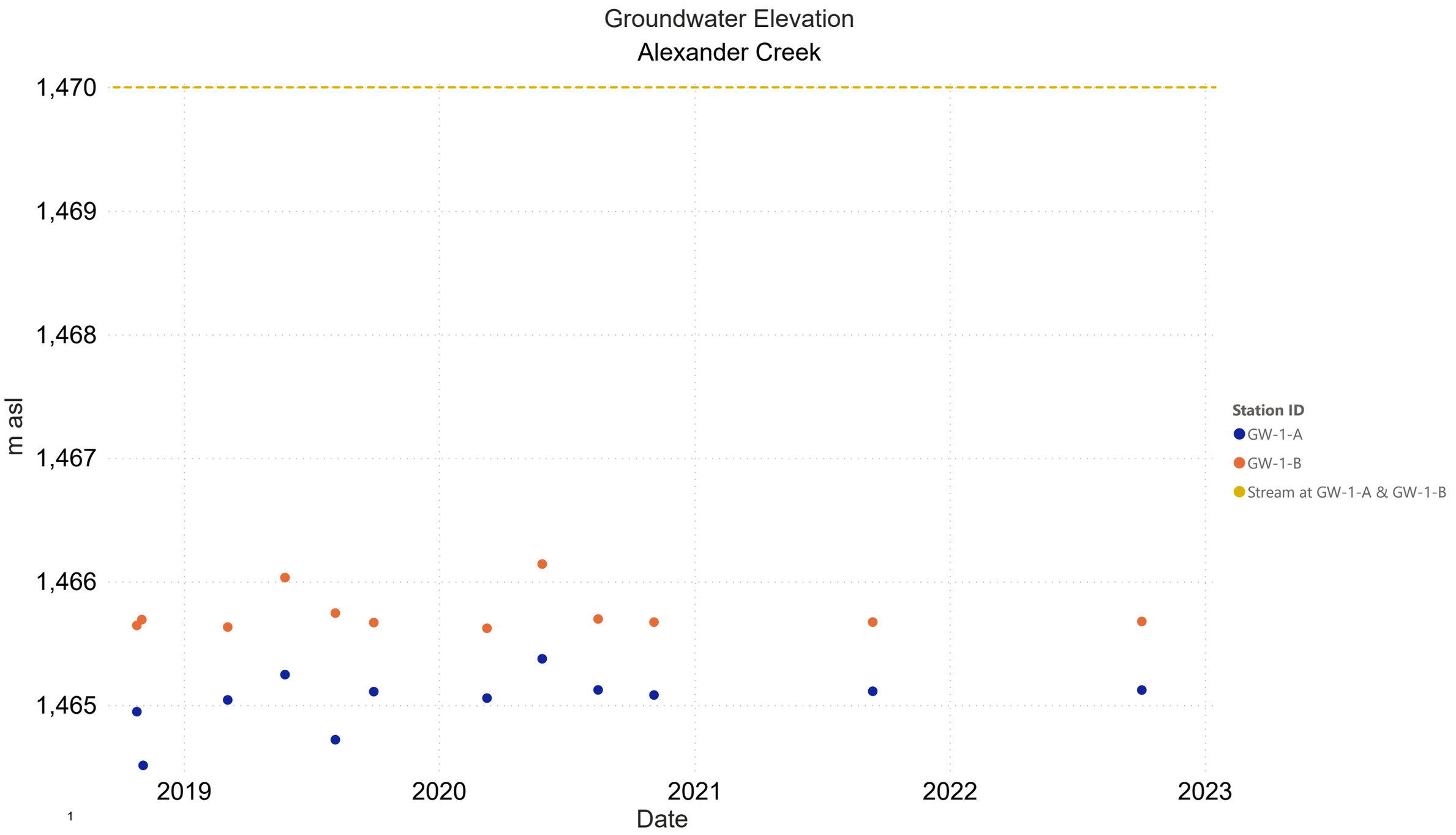
East Alexander Creek									
Parameter	Station ID	GW-4-BR	GW-4-OB	GW-6-BR	GW-6-OB	A4	A5	Surface Water Quality - Predictions	
	Screened Unit	BR	OB - Till	BR	OB - FL	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Selenium (Se)-Dissolved [µg/L]	January					0.923 (3)	1.433 (3)	7.79	158
	February					0.918 (2)	1.4 (3)	8.15	158
	March	0.2 (2)			0.122 (2)	1 (6)	1.629 (6)	7.36	163
	April					0.577 (2)	0.987 (3)	4.46	173
	May	0.382 (3)	1.69 (1)			0.26 (9)	0.278 (8)	3.92	169
	June			0.35 (1)	0.235 (2)	0.275 (7)	0.237 (8)	4.51	166
	July					0.592 (5)	0.682 (5)	5.30	165
	August	0.358 (1)	0.504 (1)	0.141 (1)	0.253 (1)	0.798 (7)	0.972 (8)	6.10	164
	September	0.305 (2)	0.35 (1)	0.108 (1)	0.07 (1)	0.842 (9)	0.983 (9)	6.46	165
	October	0.05 (1)	0.165 (1)	0.148 (2)	0.097 (2)	0.794 (2)	1.1 (3)	6.28	165
	November	0.442 (2)	1.19 (1)	0.159 (1)	0.081 (1)	0.843 (5)	1.153 (4)	6.23	165
	December					0.997 (3)	1.335 (4)	7.09	163
Arsenic (As)-Dissolved [µg/L]	January					0.1127 (3)	0.1143 (3)	0.517	158
	February					0.098 (2)	0.106 (3)	0.554	158
	March	0.97 (2)			0.575 (2)	0.1198 (6)	0.1127 (6)	0.509	163
	April					0.1165 (2)	0.114 (3)	0.322	173
	May	1.1533 (3)	0.1 (1)			0.1167 (9)	0.1066 (8)	0.283	169
	June			2.05 (1)	0.52 (2)	0.1184 (7)	0.1003 (8)	0.319	166
	July					0.1094 (5)	0.1042 (5)	0.370	165
	August	1.4 (1)	0.34 (1)	3.5 (1)	0.6 (1)	0.1164 (7)	0.1201 (8)	0.423	164
	September	1.1 (2)	0.39 (1)	3.25 (1)	0.34 (1)	0.1059 (9)	0.0976 (9)	0.447	165
	October	1.06 (1)	0.21 (1)	3.045 (2)	0.385 (2)	0.109 (2)	0.0877 (3)	0.435	165
	November	0.875 (2)	0.23 (1)	3.59 (1)	0.55 (1)	0.1192 (5)	0.0998 (4)	0.424	165
	December					0.1287 (3)	0.1213 (4)	0.470	163
Iron (Fe)-Dissolved [mg/L]	January					0.00223 (3)	0.001 (3)	0.0105	158
	February					0.001 (2)	0.001 (3)	0.0108	158
	March	0.0115 (2)			0.1755 (2)	0.00553 (6)	0.00563 (6)	0.0103	163
	April					0.00145 (2)	0.00133 (3)	0.0085	173
	May	0.06367 (3)	0.01 (1)			0.00588 (9)	0.00203 (8)	0.0082	169
	June			0.413 (1)	0.352 (2)	0.00814 (7)	0.00479 (8)	0.0086	166
	July					0.00382 (5)	0.0037 (5)	0.0090	165
	August	0.037 (1)	0.01 (1)	3.19 (1)	0.293 (1)	0.00387 (7)	0.00434 (8)	0.0095	164
	September	0.045 (2)	0.062 (1)	2.89 (1)	0.176 (1)	0.00296 (9)	0.00278 (9)	0.0097	165
	October	0.06 (1)	0.03 (1)	1.8085 (2)	0.302 (2)	0.001 (2)	0.00297 (3)	0.0095	165
	November	0.0385 (2)	0.01 (1)	3.1 (1)	0.492 (1)	0.00554 (5)	0.00488 (4)	0.0095	165
	December					0.00403 (3)	0.00418 (4)	0.0100	163
Lithium (Li)-Dissolved [µg/L]	January					1.69 (3)	0.5 (3)	0.865	158
	February					1.57 (2)	0.5 (3)	0.860	158
	March	28.7 (2)			27.25 (2)	1.77 (6)	0.75 (6)	0.834	163
	April					1.47 (2)	0.5 (3)	0.808	173
	May	31.2 (3)	10.3 (1)			0.82 (9)	0.5 (8)	0.831	169
	June			618 (1)	31.05 (2)	0.66 (7)	0.63 (8)	0.837	166
	July					1.02 (5)	0.6 (5)	0.841	165
	August	35.4 (1)	2.1 (1)	737 (1)	26.6 (1)	1.37 (7)	0.63 (8)	0.840	164
	September	31.45 (2)	2.5 (1)	743 (1)	19.1 (1)	1.43 (9)	0.65 (9)	0.835	165
	October	31.9 (1)	2.9 (1)	896 (2)	22.55 (2)	1.22 (2)	0.77 (3)	0.831	165
	November	30.35 (2)	2.4 (1)	920 (1)	20.6 (1)	1.52 (5)	0.69 (4)	0.841	165
	December					1.43 (3)	0.63 (4)	0.860	163

East Alexander Creek									
Parameter	Station ID	GW-4-BR	GW-4-OB	GW-6-BR	GW-6-OB	A4	A5	Surface Water Quality - Predictions	
	Screened Unit	BR	OB - Till	BR	OB - FL	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Nickel (Ni)-Dissolved [µg/L]	January					0.151 (3)	0.086 (3)	37.8	158
	February					0.168 (2)	0.065 (3)	41.4	158
	March	1.24 (2)			0.73 (2)	0.373 (6)	0.295 (6)	37.5	163
	April					0.221 (2)	0.104 (3)	20.1	173
	May	0.527 (3)	0.55 (1)			0.279 (9)	0.168 (8)	16.2	169
	June			4.73 (1)	0.66 (2)	0.338 (7)	0.228 (8)	19.5	166
	July					0.27 (5)	0.222 (5)	24.3	165
	August	0.5 (1)	0.68 (1)	3.17 (1)	0.84 (1)	0.276 (7)	0.221 (8)	29.3	164
	September	0.5 (2)	0.67 (1)	1.23 (1)	0.65 (1)	0.232 (9)	0.137 (9)	31.6	165
	October	0.5 (1)	0.5 (1)	1.68 (2)	0.775 (2)	0.238 (2)	0.185 (3)	30.5	165
	November	0.675 (2)	0.7 (1)	3.04 (1)	0.73 (1)	0.369 (5)	0.218 (4)	29.2	165
	December					0.29 (3)	0.197 (4)	33.3	163
Cobalt (Co)-Dissolved [µg/L]	January					0.005 (3)	0.005 (3)	14.5	158
	February					0.0055 (2)	0.0053 (3)	15.9	158
	March	0.485 (2)			0.225 (2)	0.0534 (6)	0.0531 (6)	14.4	163
	April					0.0113 (2)	0.0093 (3)	7.6	173
	May	0.2533 (3)	0.1 (1)			0.0137 (9)	0.012 (8)	6.1	169
	June			10.1 (1)	0.3 (2)	0.0384 (7)	0.0333 (8)	7.4	166
	July					0.0268 (5)	0.0272 (5)	9.3	165
	August	0.11 (1)	0.13 (1)	7.42 (1)	0.55 (1)	0.0327 (7)	0.0294 (8)	11.2	164
	September	0.185 (2)	0.17 (1)	6.05 (1)	0.24 (1)	0.0177 (9)	0.0166 (9)	12.1	165
	October	0.24 (1)	0.1 (1)	4.77 (2)	0.235 (2)	0.009 (2)	0.0087 (3)	11.7	165
	November	0.34 (2)	0.26 (1)	8.39 (1)	0.37 (1)	0.043 (5)	0.0288 (4)	11.2	165
	December					0.0373 (3)	0.0288 (4)	12.8	163
Sodium (Na)-Dissolved [mg/L]	January					0.667 (3)	0.234 (3)	0.246	158
	February					0.546 (2)	0.232 (3)	0.244	158
	March	50.65 (2)			9.185 (2)	0.561 (6)	0.256 (6)	0.237	163
	April					0.662 (2)	0.223 (3)	0.229	173
	May	48.067 (3)	3.04 (1)			0.393 (9)	0.2 (8)	0.236	169
	June			263 (1)	10.055 (2)	0.307 (7)	0.185 (8)	0.237	166
	July					0.356 (5)	0.22 (5)	0.238	165
	August	66.2 (1)	7.44 (1)	283 (1)	7.18 (1)	0.394 (7)	0.23 (8)	0.239	164
	September	49.85 (2)	1.81 (1)	228 (1)	6.09 (1)	0.384 (9)	0.214 (9)	0.237	165
	October	30.8 (1)	2.19 (1)	226.5 (2)	6.23 (2)	0.441 (2)	0.401 (3)	0.236	165
	November	47.05 (2)	14.8 (1)	258 (1)	6.34 (1)	0.51 (5)	0.239 (4)	0.239	165
	December					0.469 (3)	0.233 (4)	0.244	163
Manganese (Mn)-Dissolved [mg/L]	January					0.16 (3)	0.05 (3)	0.0276	158
	February					0.05 (2)	0.05 (3)	0.0302	158
	March	283 (2)			953.5 (2)	0.11 (6)	0.08 (6)	0.0274	163
	April					0.08 (2)	0.05 (3)	0.0149	173
	May	294 (3)	1.06 (1)			0.31 (9)	0.1 (8)	0.0121	169
	June			1000 (1)	992 (2)	0.27 (7)	0.12 (8)	0.0145	166
	July					0.11 (5)	0.11 (5)	0.0178	165
	August	368 (1)	21.2 (1)	1380 (1)	1020 (1)	0.07 (7)	0.08 (8)	0.0214	164
	September	396 (2)	59.8 (1)	1190 (1)	706 (1)	0.06 (9)	0.06 (9)	0.0231	165
	October	514 (1)	5 (1)	1055 (2)	710.5 (2)	0.05 (2)	0.06 (3)	0.0223	165
	November	282 (2)	22.5 (1)	1290 (1)	871 (1)	0.09 (5)	0.08 (4)	0.0215	165
	December					0.067 (3)	0.082 (4)	0.0245	163

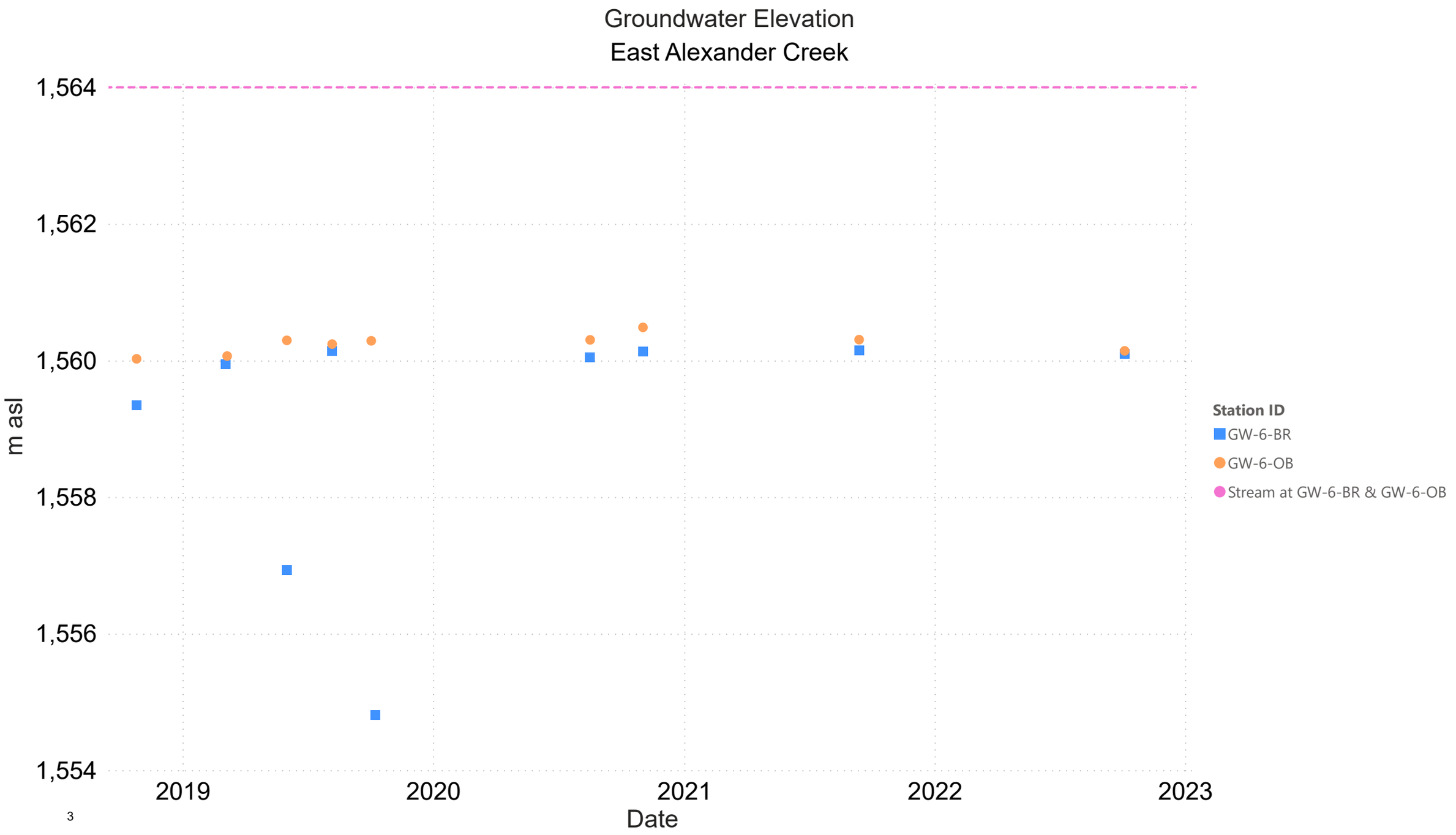
East Alexander Creek									
Parameter	Station ID	GW-4-BR	GW-4-OB	GW-6-BR	GW-6-OB	A4	A5	Surface Water Quality - Predictions	
	Screened Unit	BR	OB - Till	BR	OB - FL	N/A	N/A	Sed Pond Effluent Concentrations	Sed Pond Effluent Flow (m3/day)
Phosphorus (P)-Dissolved [mg/L]	January							0	158
	February							0	158
	March	0.05 (2)			0.055 (2)	0.05 (3)	0.05 (3)	0	163
	April							0	173
	May	0.05 (3)	0.05 (1)					0	169
	June			0.05 (1)	0.05 (2)	0.05 (2)	0.05 (2)	0	166
	July					0.05 (1)	0.05 (1)	0	165
	August	0.05 (1)	0.05 (1)	0.085 (1)	0.424 (1)	0.05 (2)	0.05 (2)	0	164
	September	0.05 (2)	0.05 (1)	0.121 (1)	0.05 (1)	0.05 (1)	0.05 (1)	0	165
	October	0.05 (1)	0.05 (1)	0.086 (2)	0.05 (2)			0	165
	November	0.05 (2)	0.05 (1)	0.106 (1)	0.05 (1)	0.05 (2)	0.05 (1)	0	165
	December					0.05 (1)	0.05 (1)	0	163
Phosphorus [mg/L]	January					0.00593 (3)	0.0081 (3)		
	February					0.00645 (2)	0.00657 (3)		
	March					0.00762 (6)	0.0117 (6)		
	April					0.00735 (2)	0.00633 (3)		
	May					0.01682 (9)	0.00625 (8)		
	June					0.22311 (7)	0.01518 (8)		
	July					0.00502 (5)	0.00598 (5)		
	August					0.00563 (7)	0.00548 (8)		
	September					0.00498 (9)	0.00543 (9)		
	October					0.005 (2)	0.00577 (3)		
	November					0.00812 (5)	0.00973 (4)		
	December					0.00517 (3)	0.00733 (4)		

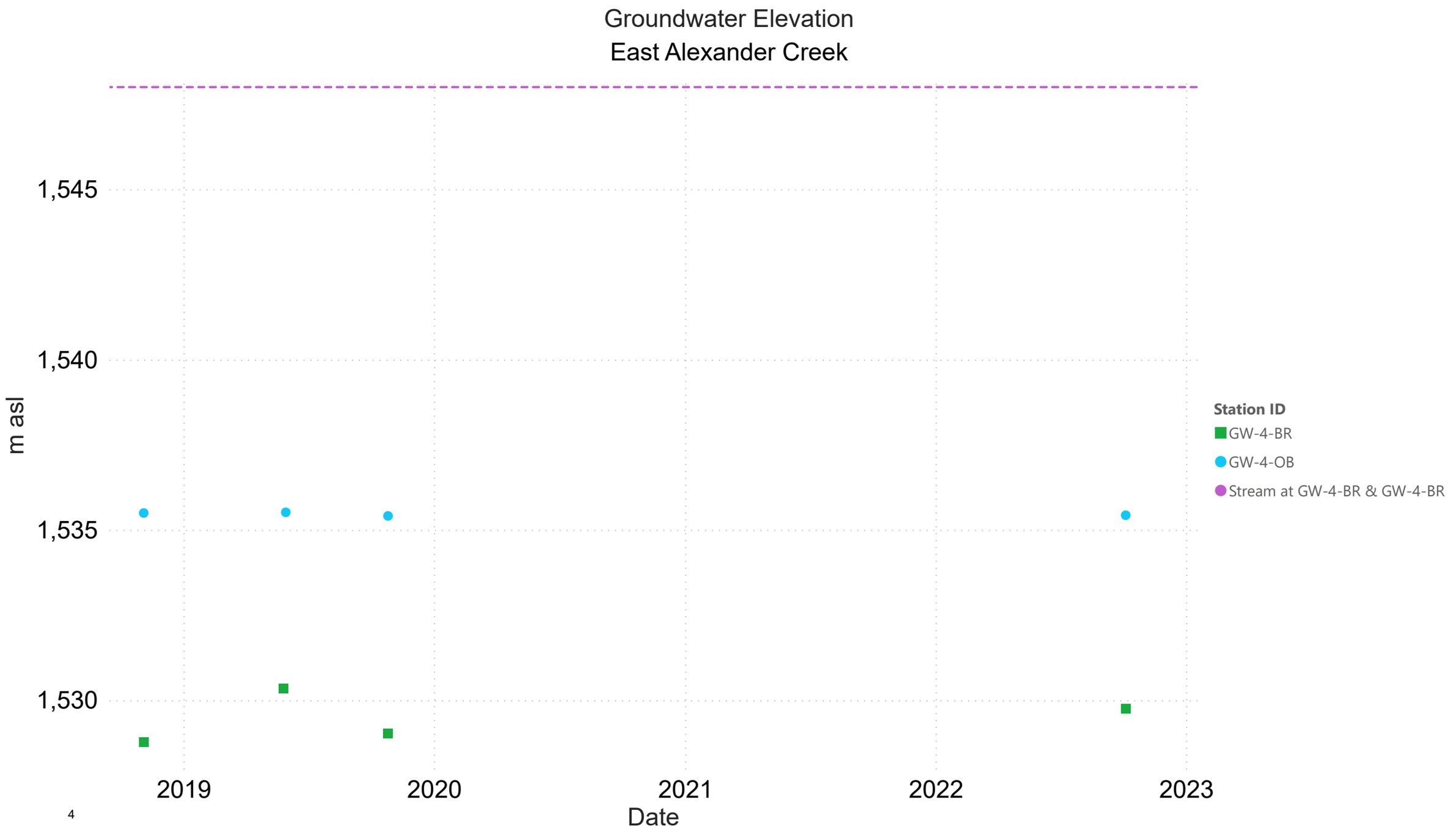
Note: The number in parenthesis correspond to the number of water quality results for the respective parameter

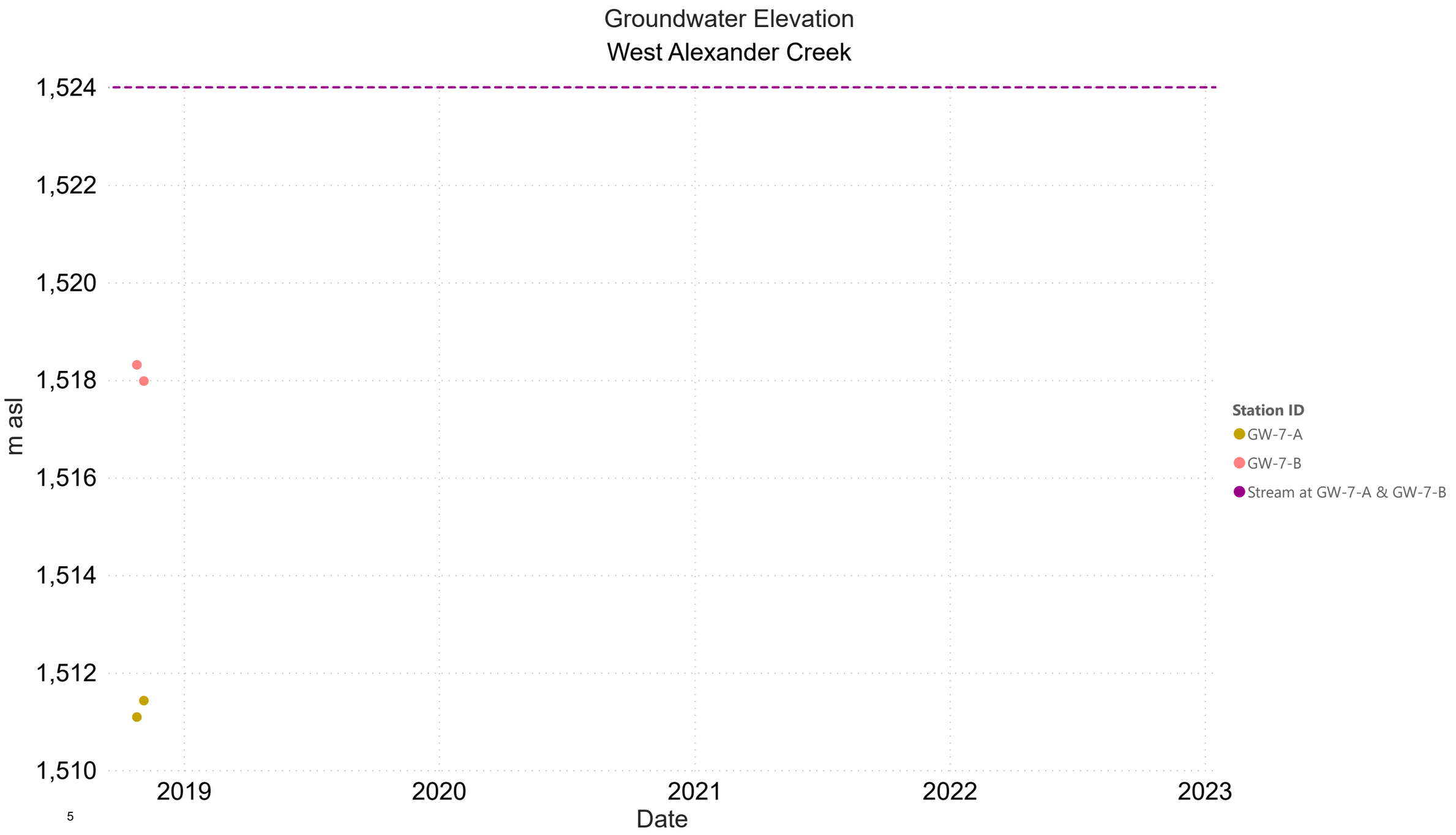
Attachment 2 Water Levels

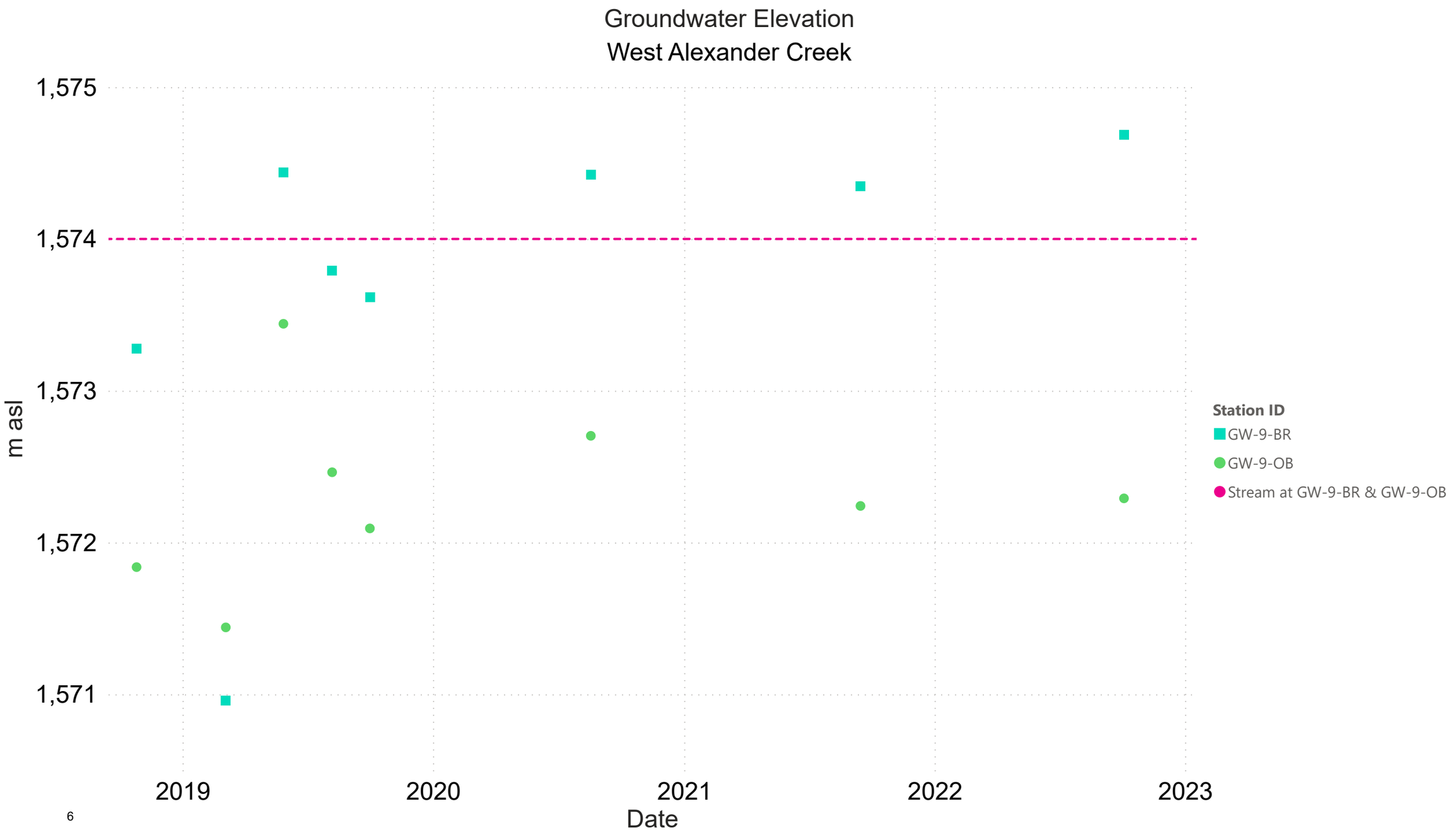

Groundwater Elevation
Alexander Creek
1,470
1,469
1,468
1,467
1,466
1,465
m asl
2019
2020
2021
2022
2023
Date
Station ID
GW-1-A
GW-1-B
Stream at GW-1-A & GW-1-B

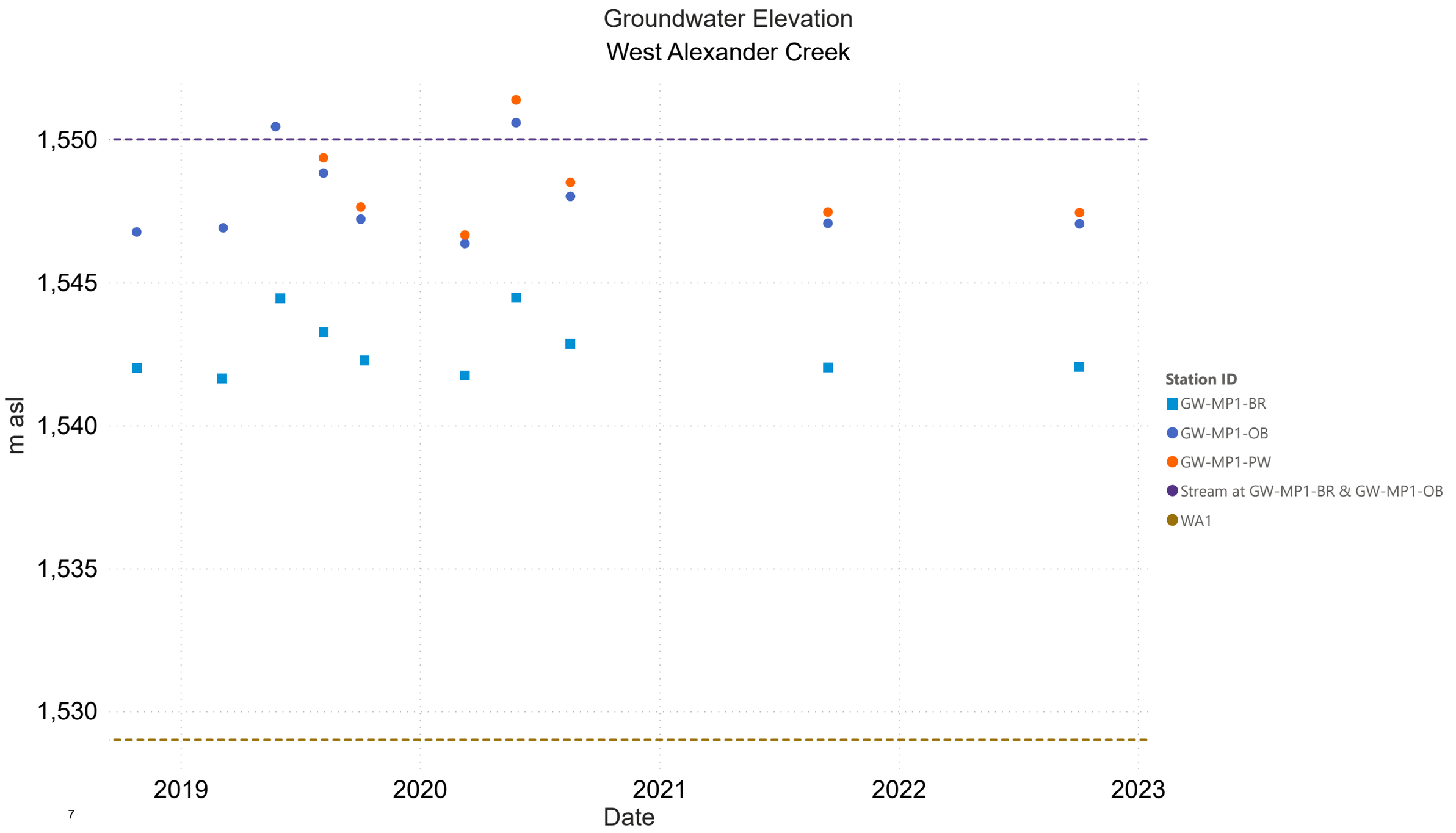

Groundwater Elevation
Alexander Creek
1,516
1,514
1,512
1,510
1,508
m asl
2019
2020
2021
2022
2023
Date
Station ID
A3
GW-3-A
GW-3-B
GW-3-C
Stream at GW-3-A & GW-3-B & GW-3-C

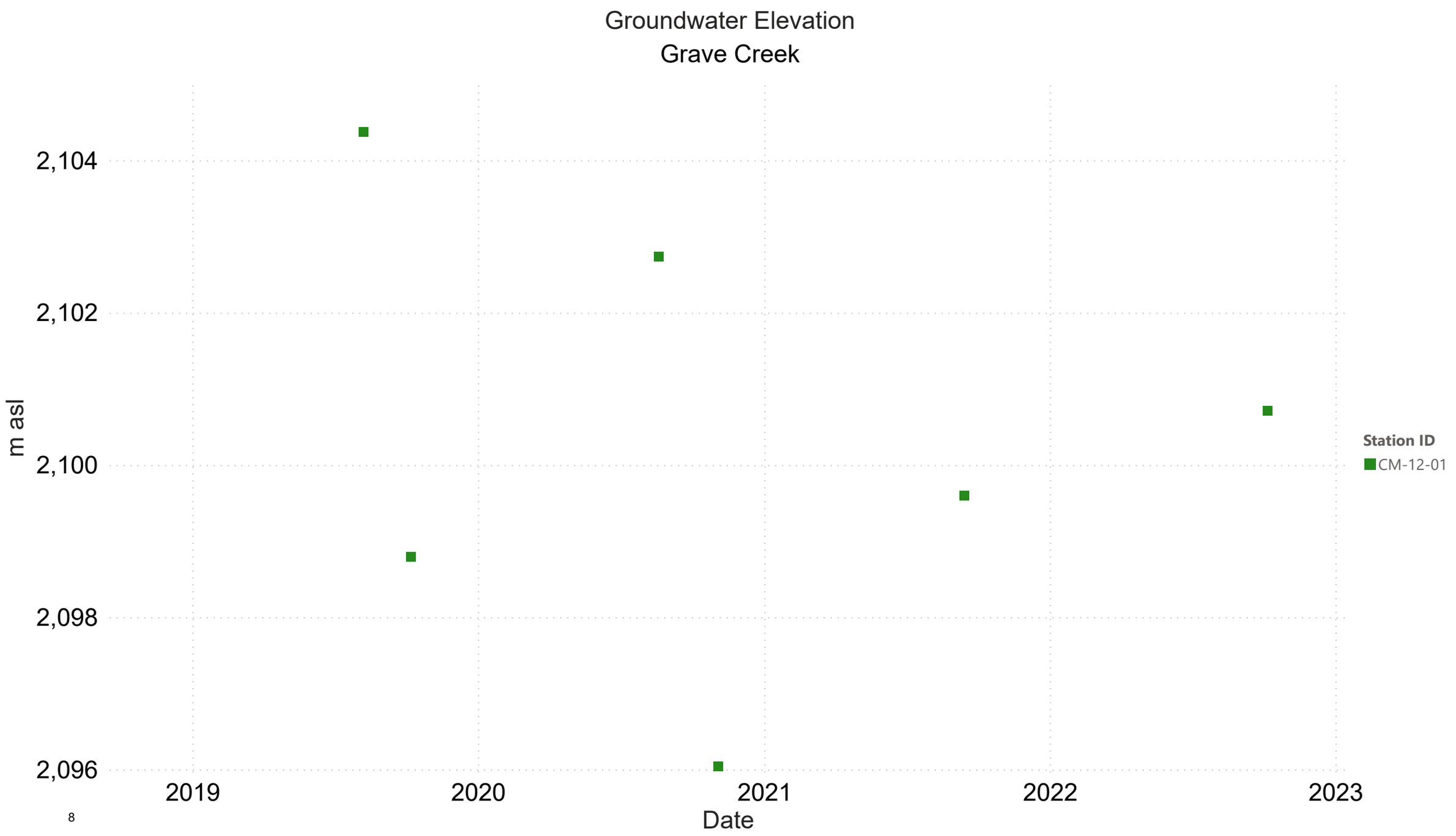

Groundwater Elevation
East Alexander Creek
1,564
1,562
1,560
1,558
1,556
1,554
m asl
2019
2020
2021
2022
2023
Date
Station ID
GW-6-BR
GW-6-OB
Stream at GW-6-BR & GW-6-OB

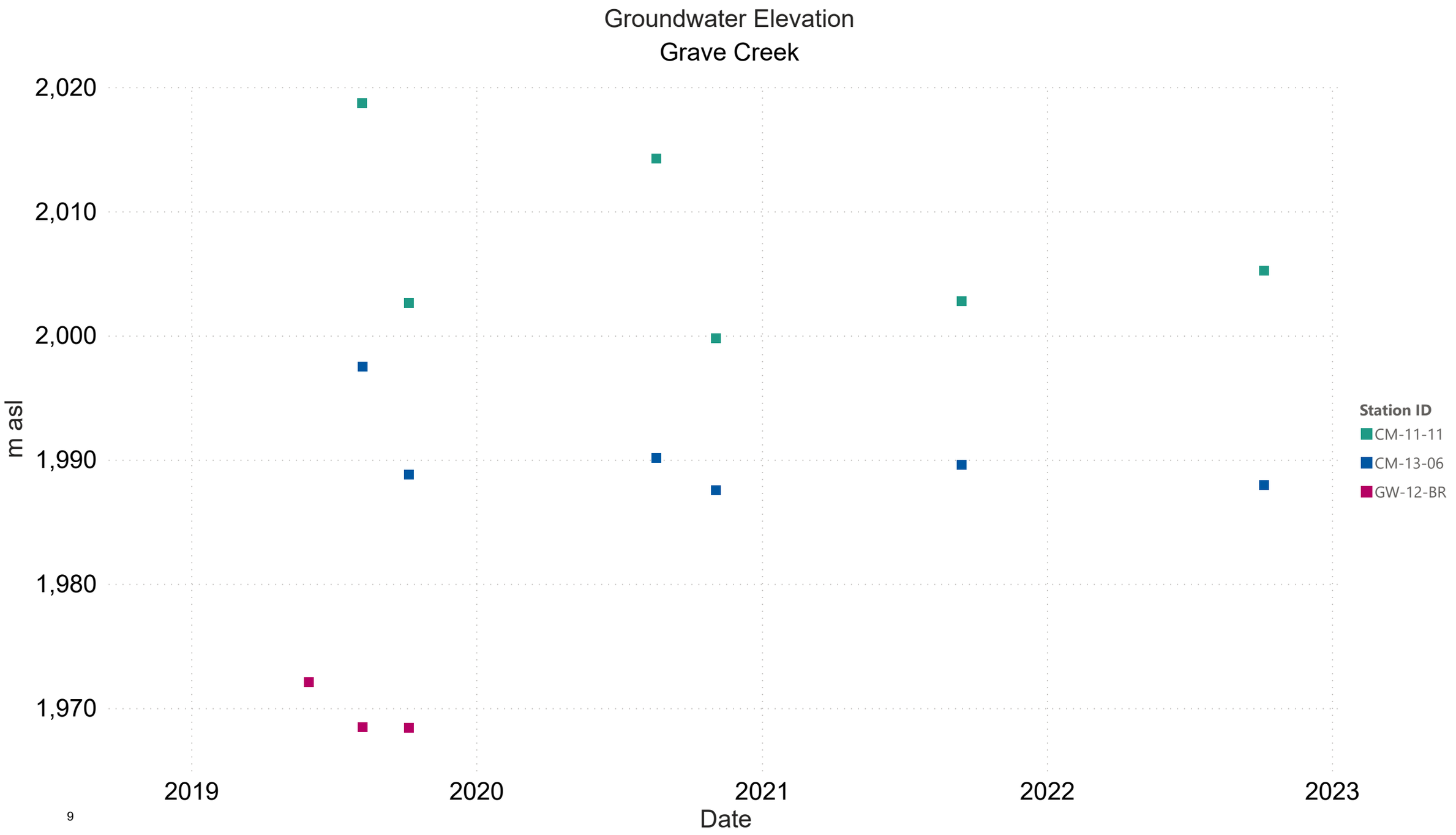

Groundwater Elevation
East Alexander Creek
1,545
1,540
1,535
1,530
m asl
2019
2020
2021
2022
2023
Date
Station ID
GW-4-BR
GW-4-OB
Stream at GW-4-BR & GW-4-BR

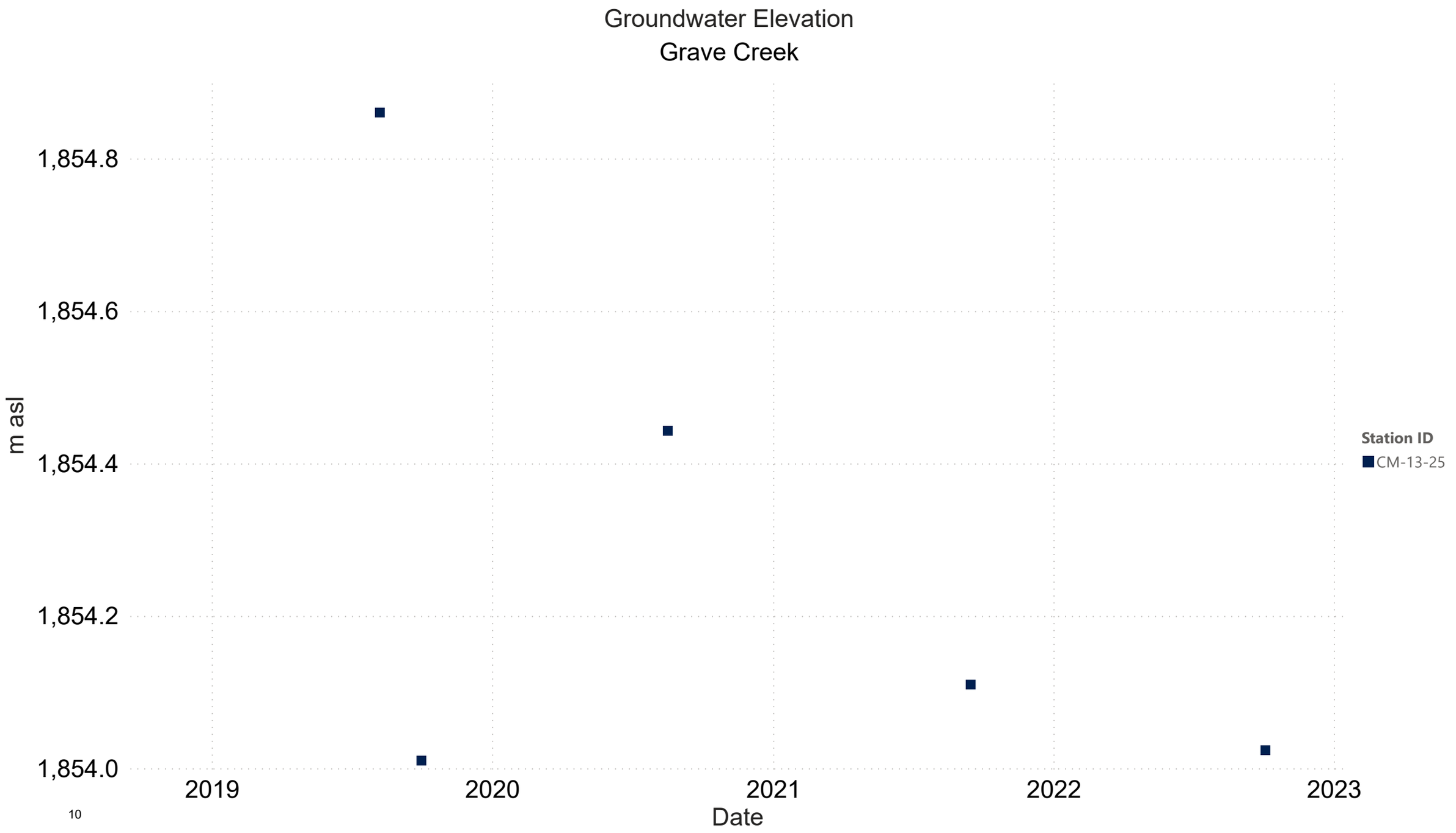

Groundwater Elevation
West Alexander Creek
1,524
1,522
1,520
1,518
1,516
1,514
1,512
1,510
m asl
2019
2020
2021
2022
2023
Date
Station ID
GW-7-A
GW-7-B
Stream at GW-7-A & GW-7-B


Groundwater Elevation
West Alexander Creek
1,575
1,574
1,573
1,572
1,571
m asl
2019
2020
2021
2022
2023
Date
Station ID
GW-9-BR
GW-9-OB
Stream at GW-9-BR & GW-9-OB


Groundwater Elevation
West Alexander Creek
1,550
1,545
1,540
1,535
1,530
m asl
2019
2020
2021
2022
2023
Date
Station ID
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
Stream at GW-MP1-BR & GW-MP1-OB
WA1


Groundwater Elevation
Grave Creek
2,104
2,102
2,100
2,098
2,096
m asl
2019
2020
2021
2022
2023
Date
Station ID
CM-12-01


Groundwater Elevation
Grave Creek
2,020
2,010
2,000
1,990
1,980
1,970
m asl
2019
2020
2021
2022
2023
Date
Station ID
CM-11-11
CM-13-06
GW-12-BR


Groundwater Elevation
Grave Creek
1,854.8
1,854.6
1,854.4
1,854.2
1,854.0
m asl
2019
2020
2021
2022
2023
Date
Station ID
CM-13-25

Attachment 3 Water Quality – Time Series Plots

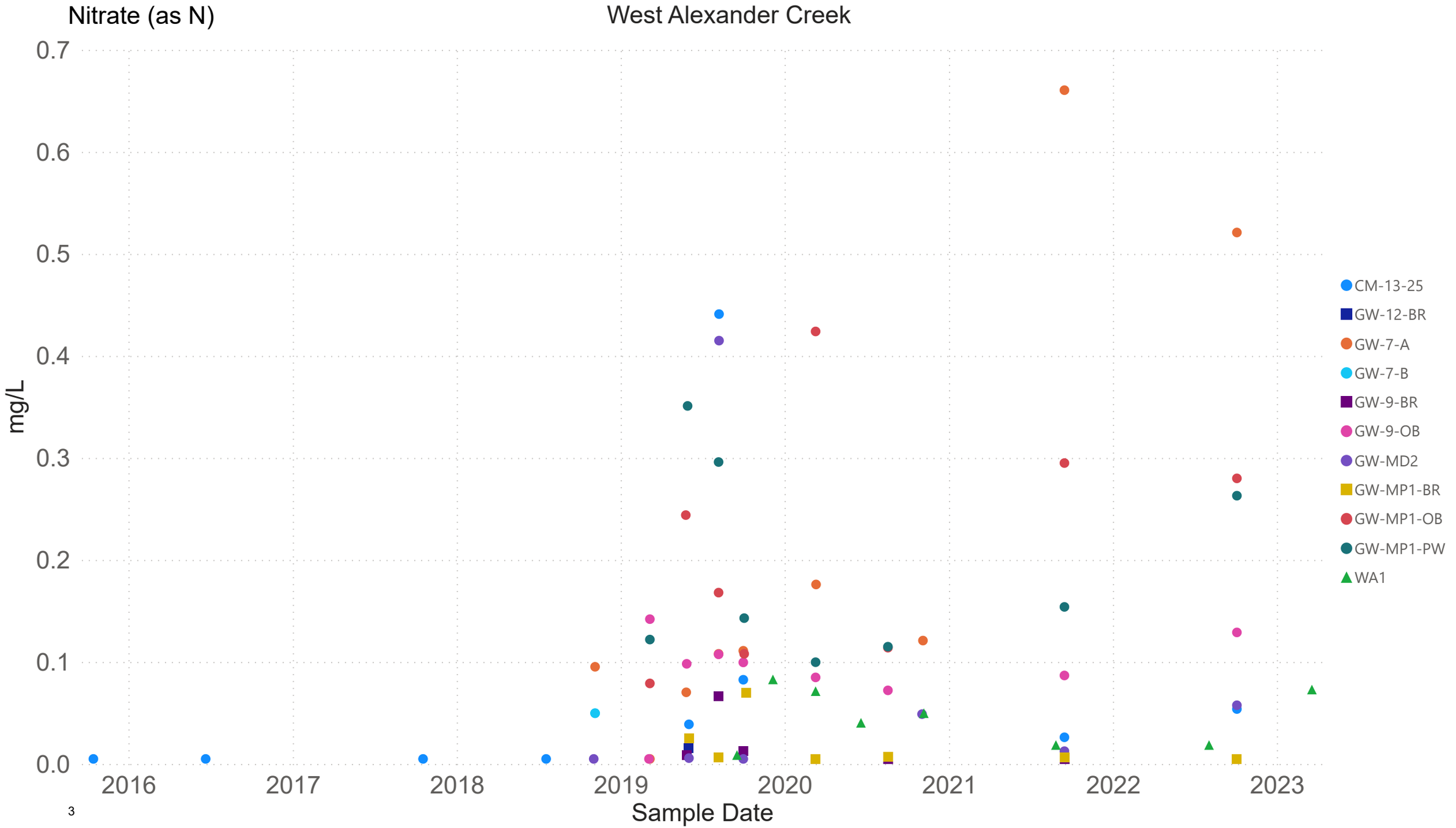
Water Quality – Time Series Plots

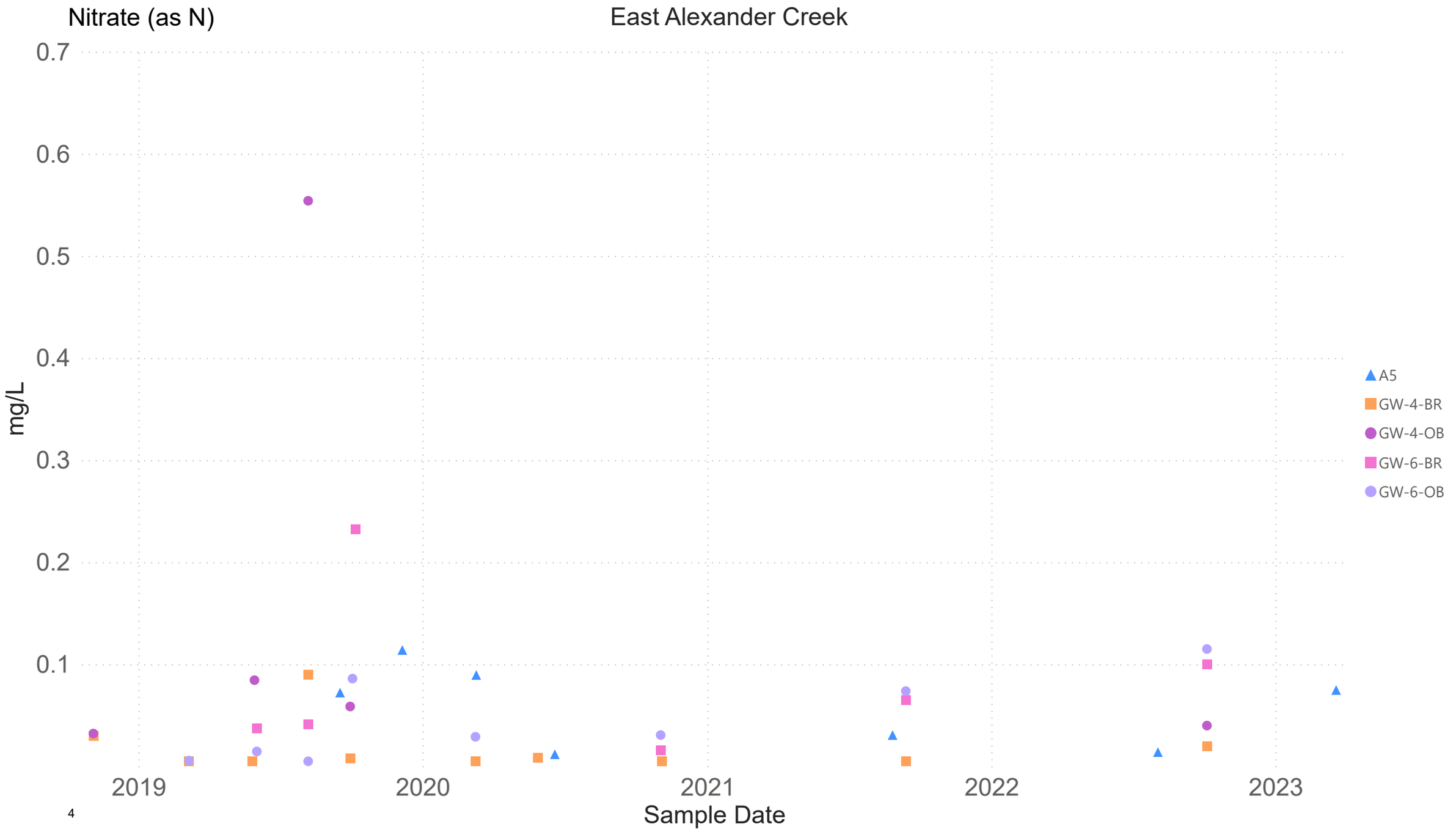
General Legend

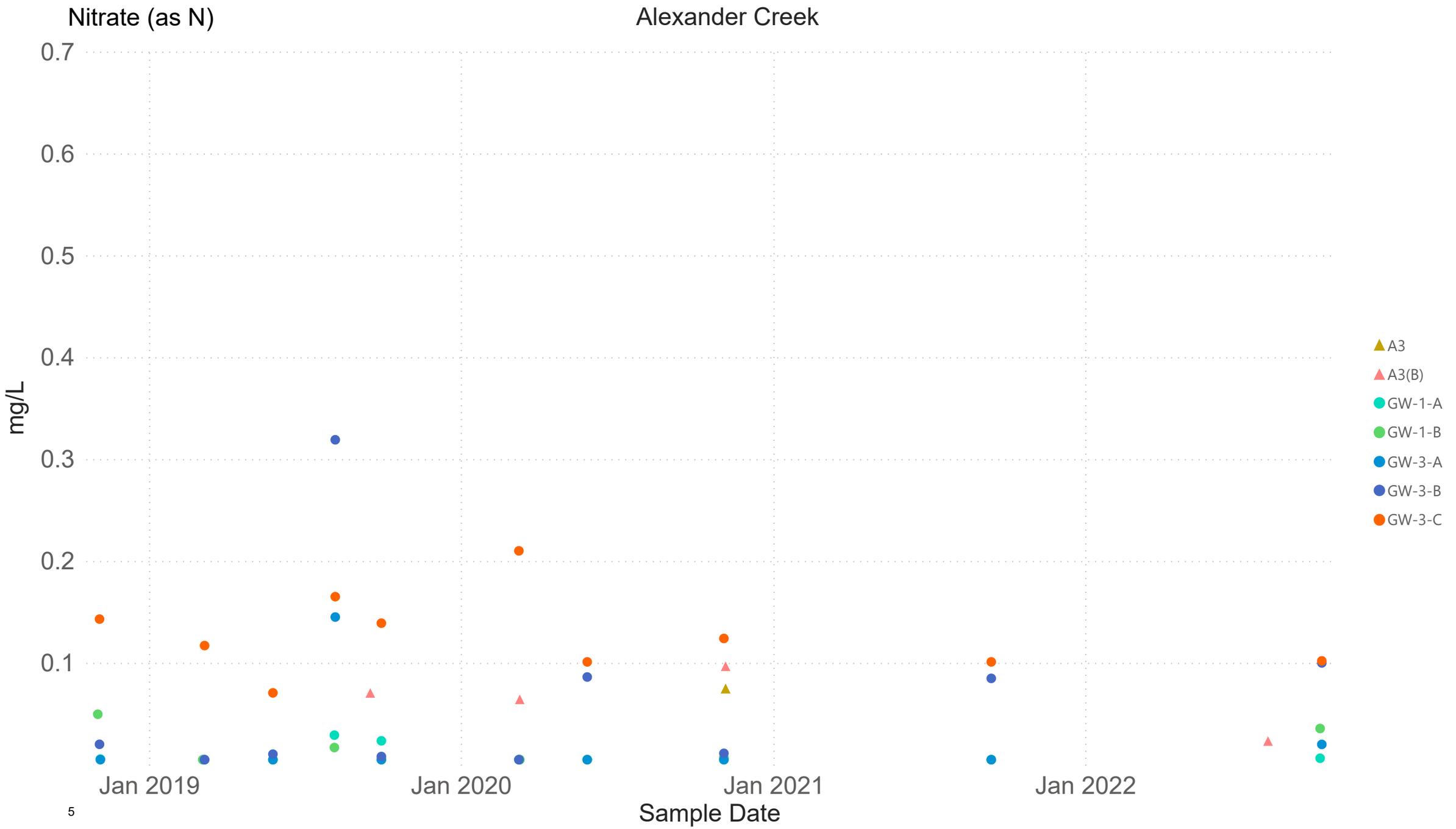
Surface Water Station

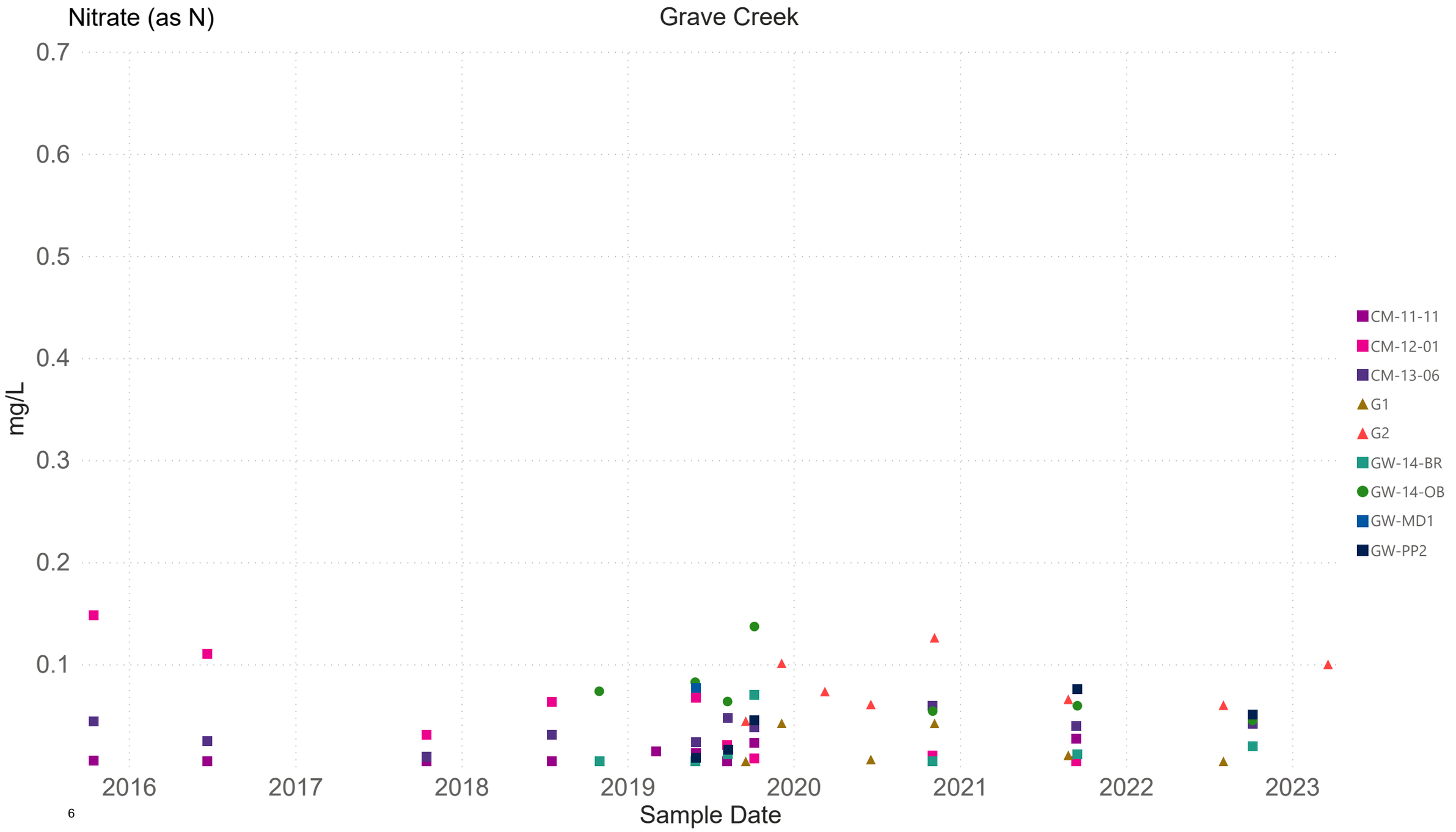
Overburden Groundwater Monitoring Station

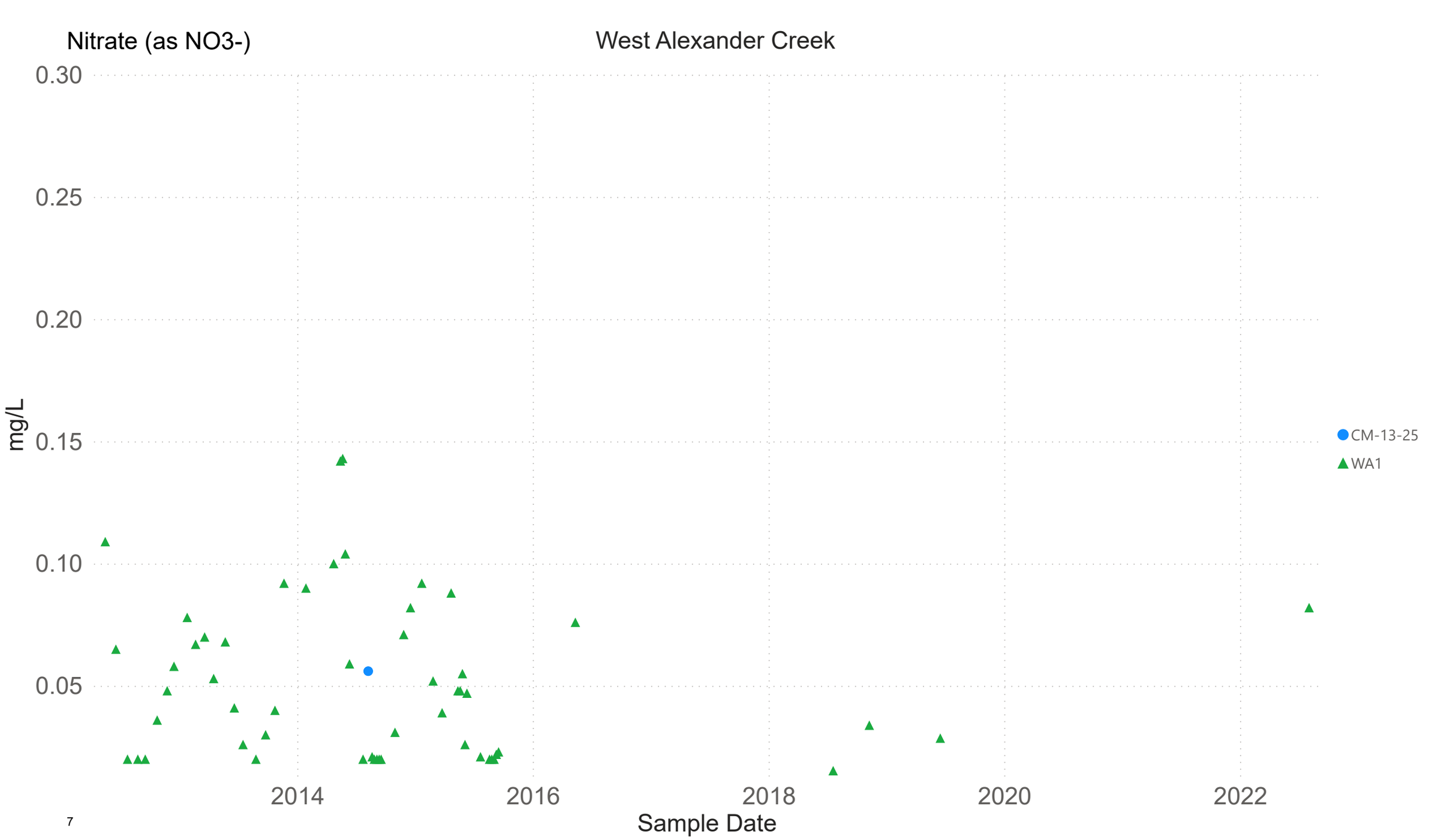
Bedrock Groundwater Monitoring Station

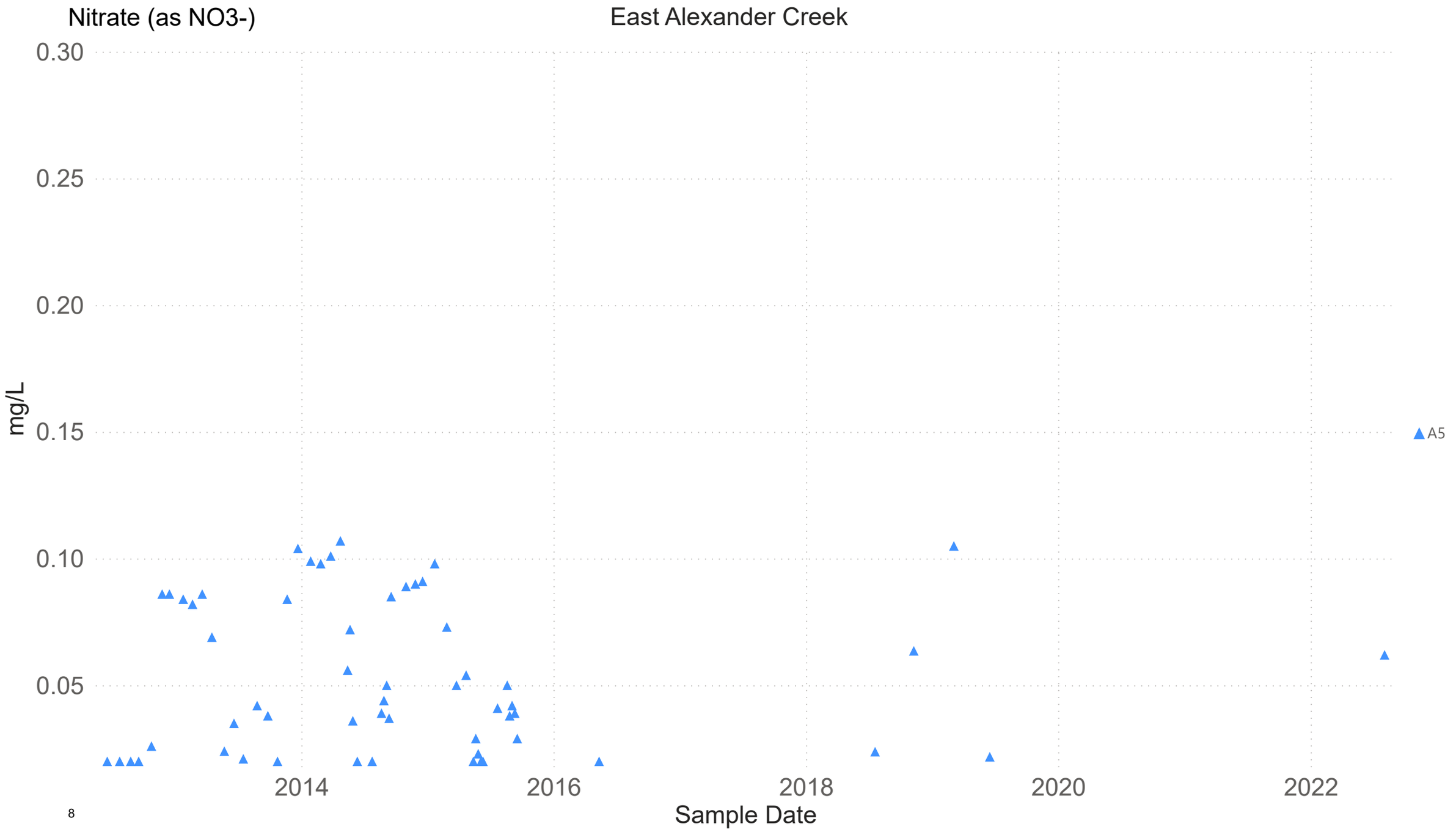

Nitrate (as N)
West Alexander Creek
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
mg/L
2016
2017
2018
2019
2020
2021
2022
2023
Sample Date
CM-13-25
GW-12-BR
GW-7-A
GW-7-B
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1

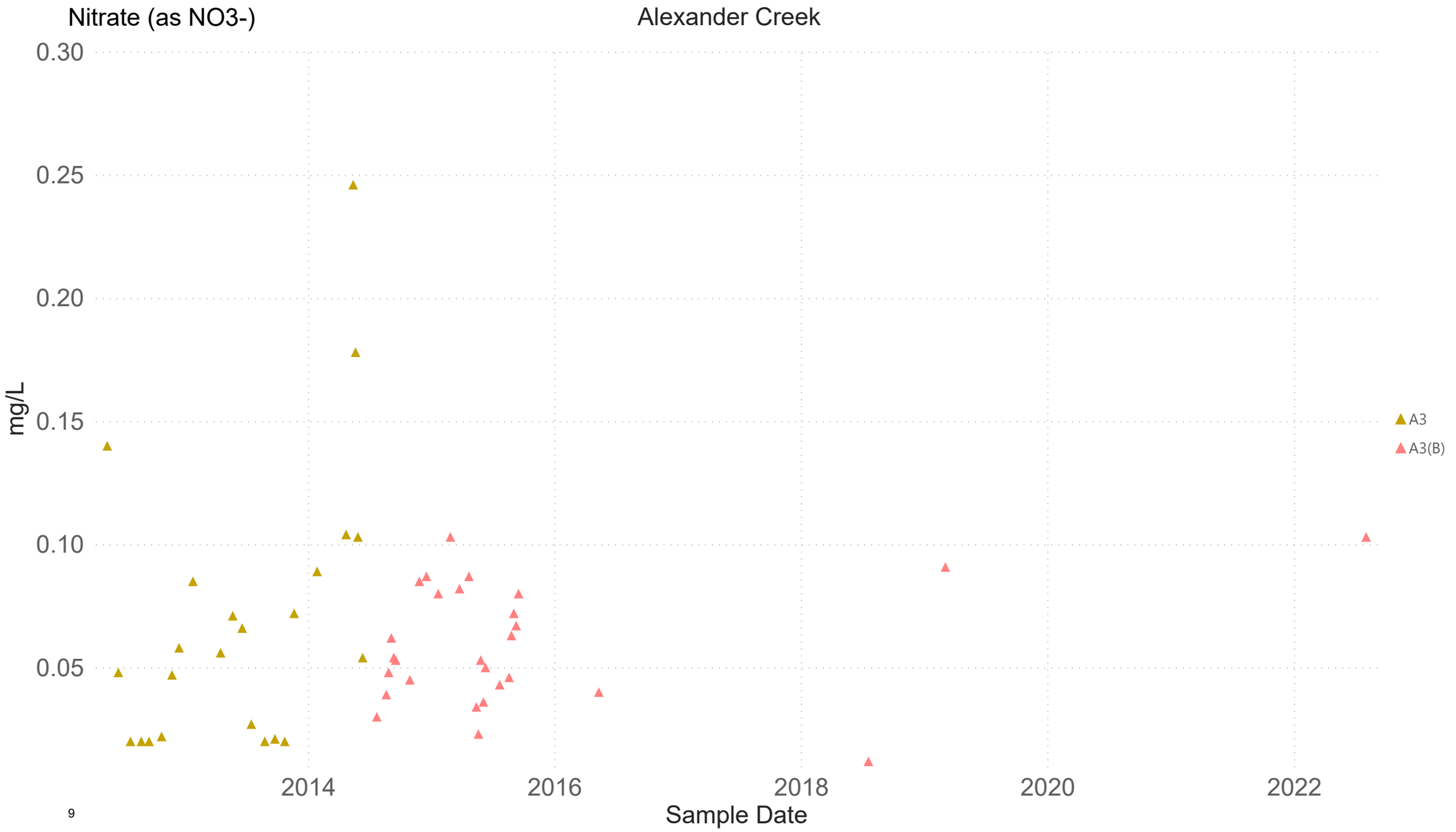

Nitrate (as N)
East Alexander Creek
0.7
0.6
0.5
0.4
0.3
0.2
0.1
mg/L
2019
2020
2021
2022
2023
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

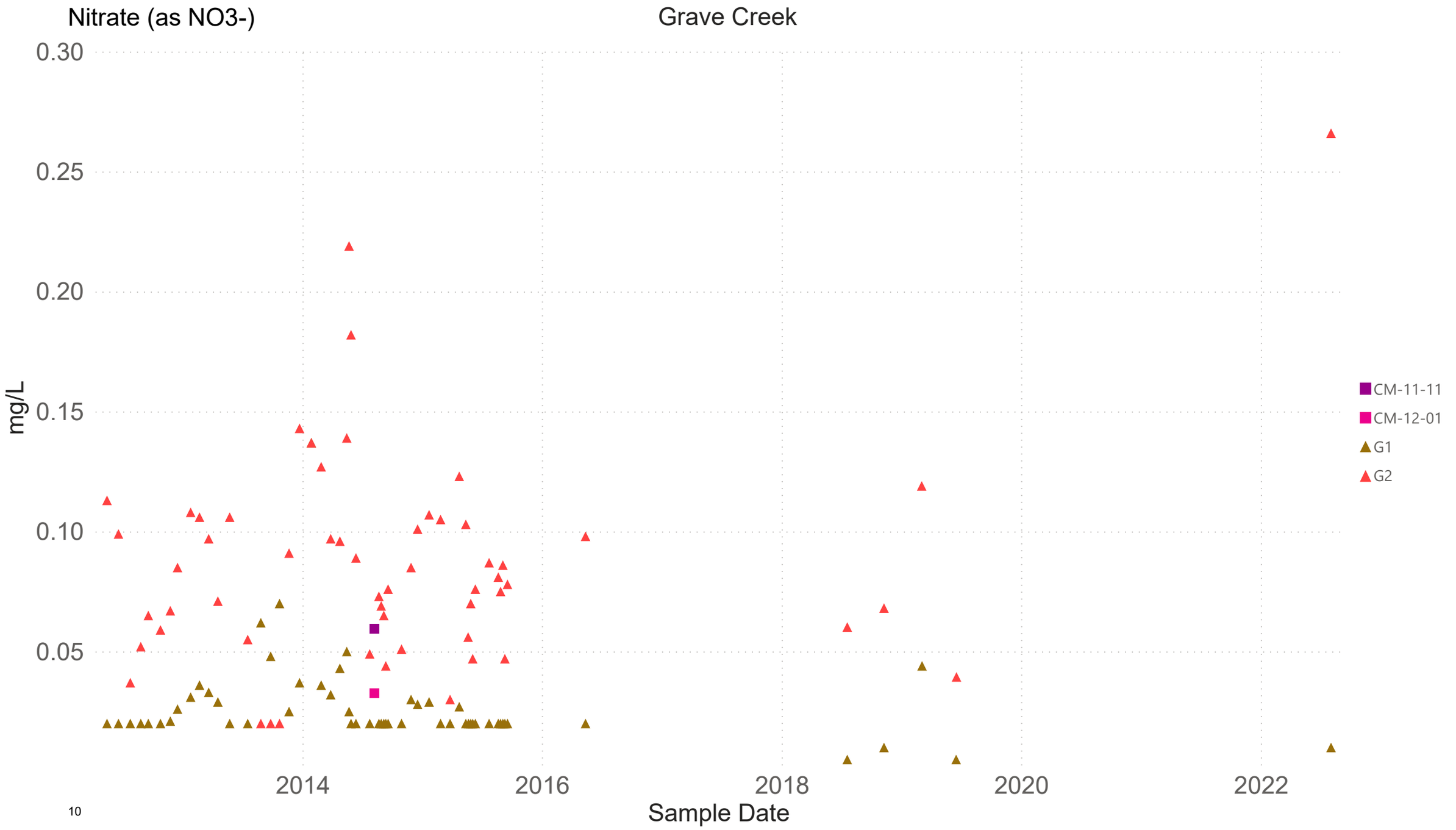

Nitrate (as N)
Alexander Creek
0.7
0.6
0.5
0.4
0.3
0.2
0.1
mg/L
Jan 2019
Jan 2020
Jan 2021
Jan 2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C

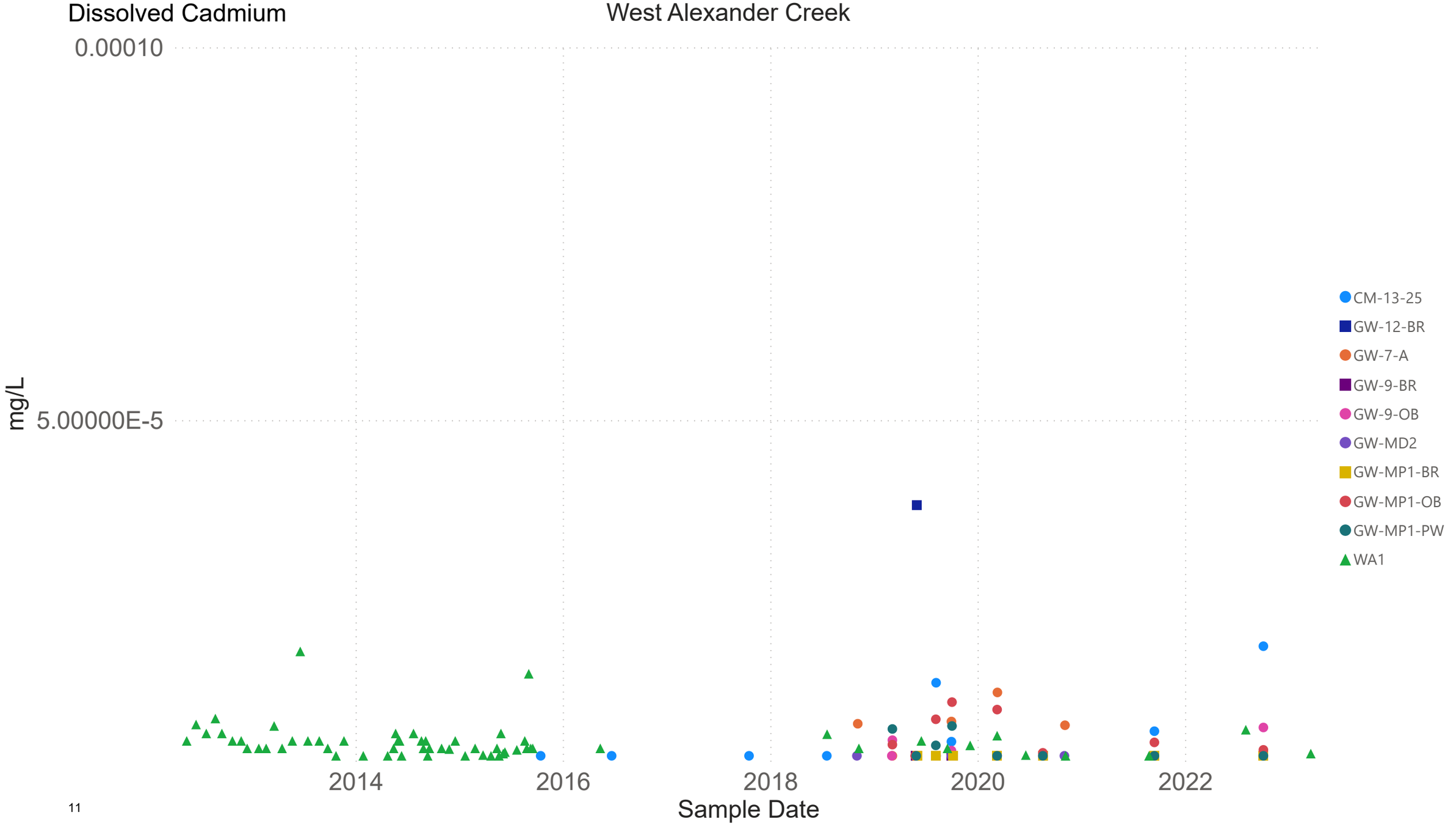

Nitrate (as N)
Grave Creek
0.7
0.6
0.5
0.4
0.3
0.2
0.1
mg/L
2016
2017
2018
2019
2020
2021
2022
2023
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2

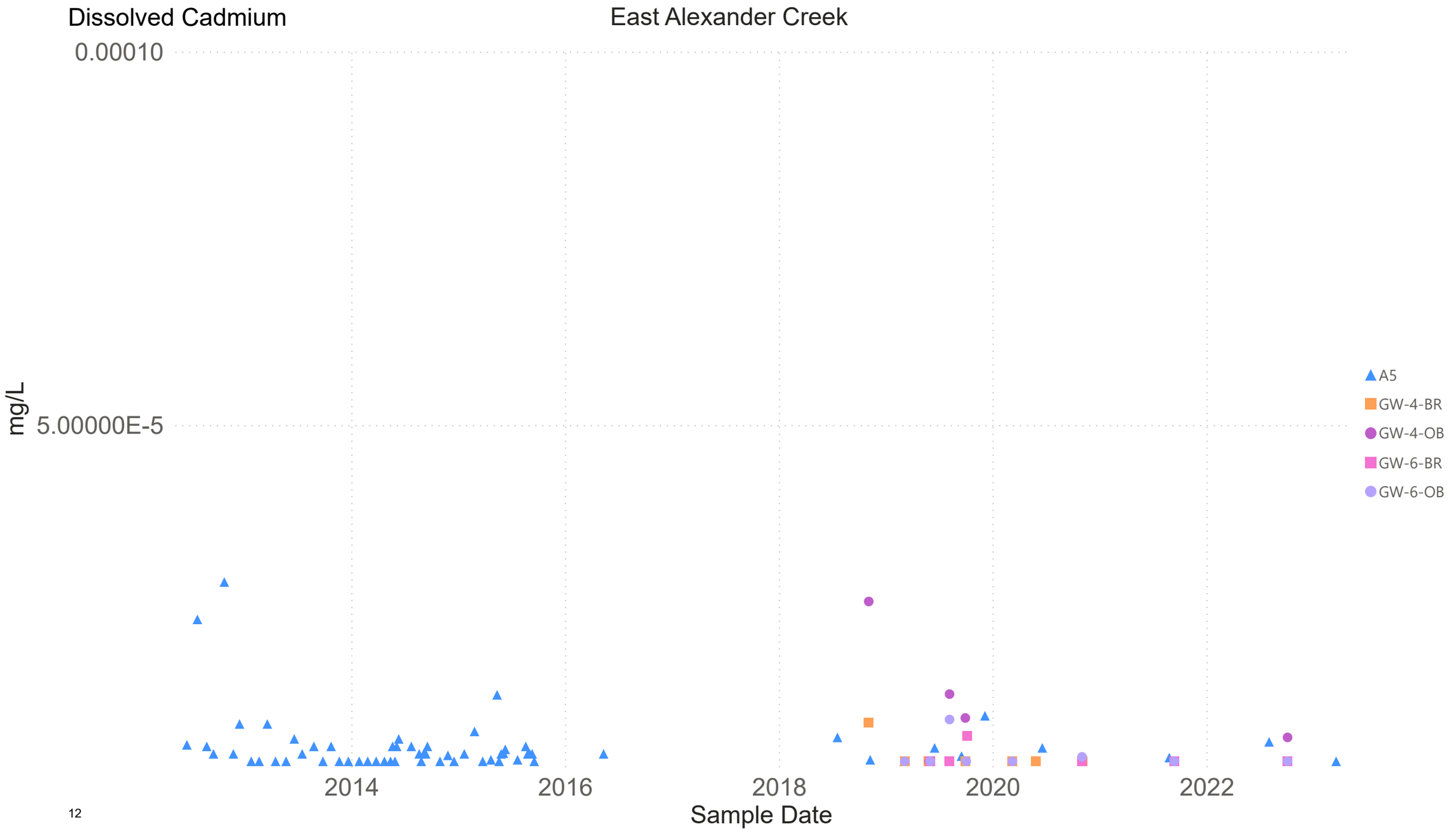

Nitrate (as NO3-)
West Alexander Creek
0.30
0.25
0.20
0.15
0.10
0.05
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-13-25
WA1

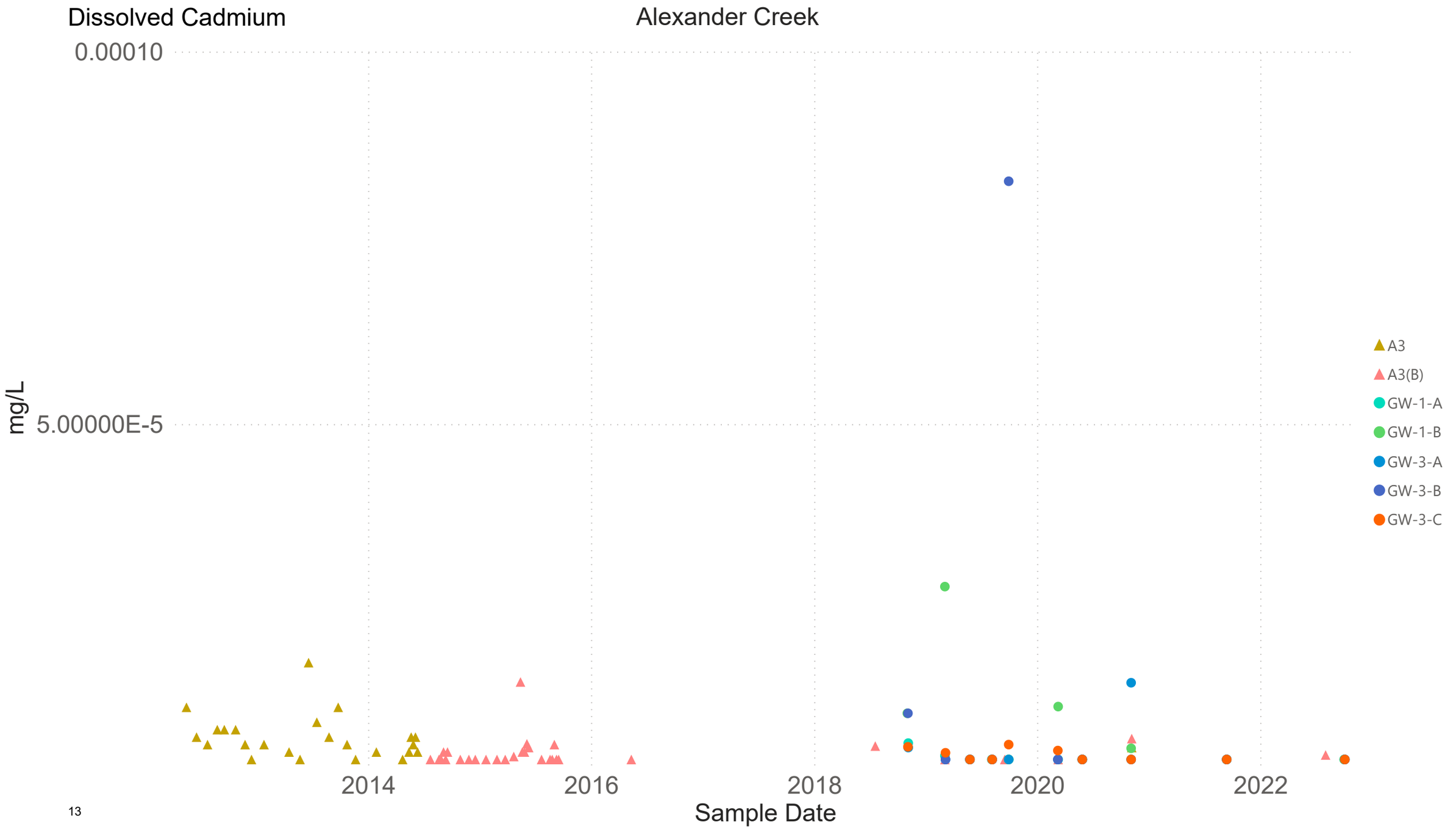

Nitrate (as NO3-)
East Alexander Creek
0.30
0.25
0.20
0.15
0.10
0.05
mg/L
2014
2016
2018
2020
2022
Sample Date
A5

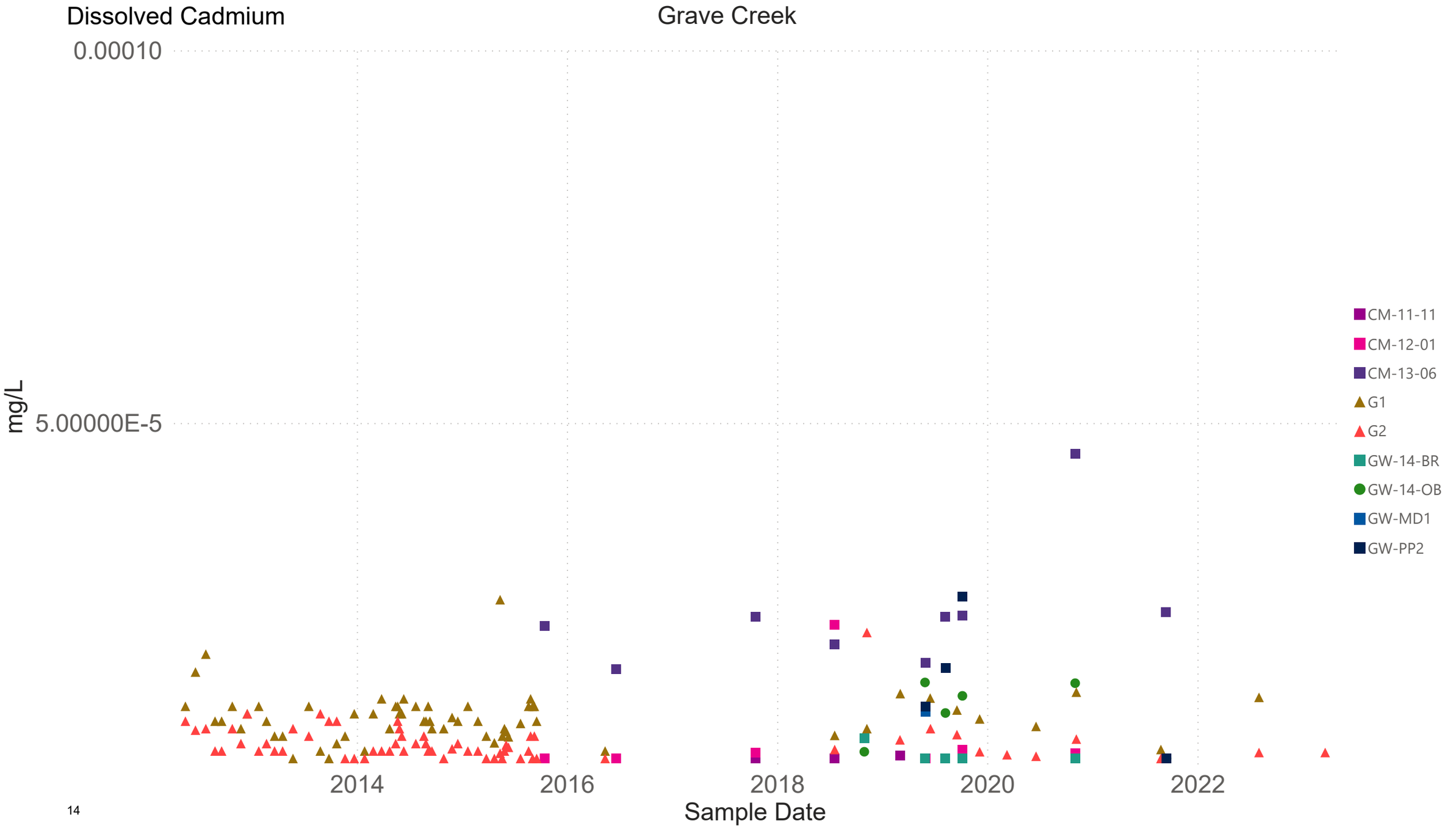

Nitrate (as NO3-)
Alexander Creek
0.30
0.25
0.20
0.15
0.10
0.05
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)

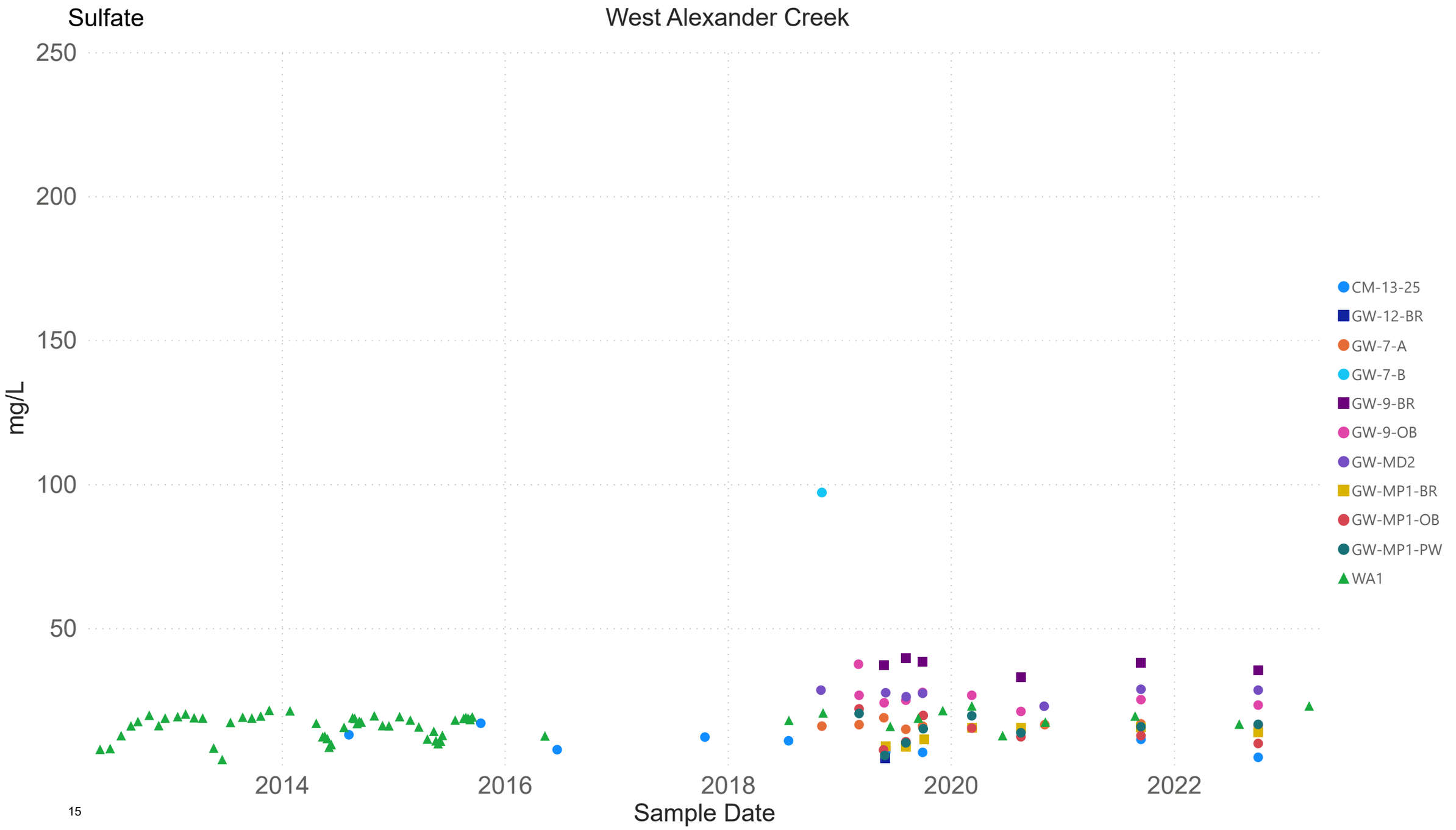

Nitrate (as NO3-)
Grave Creek
0.30
0.25
0.20
0.15
0.10
0.05
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
G1
G2

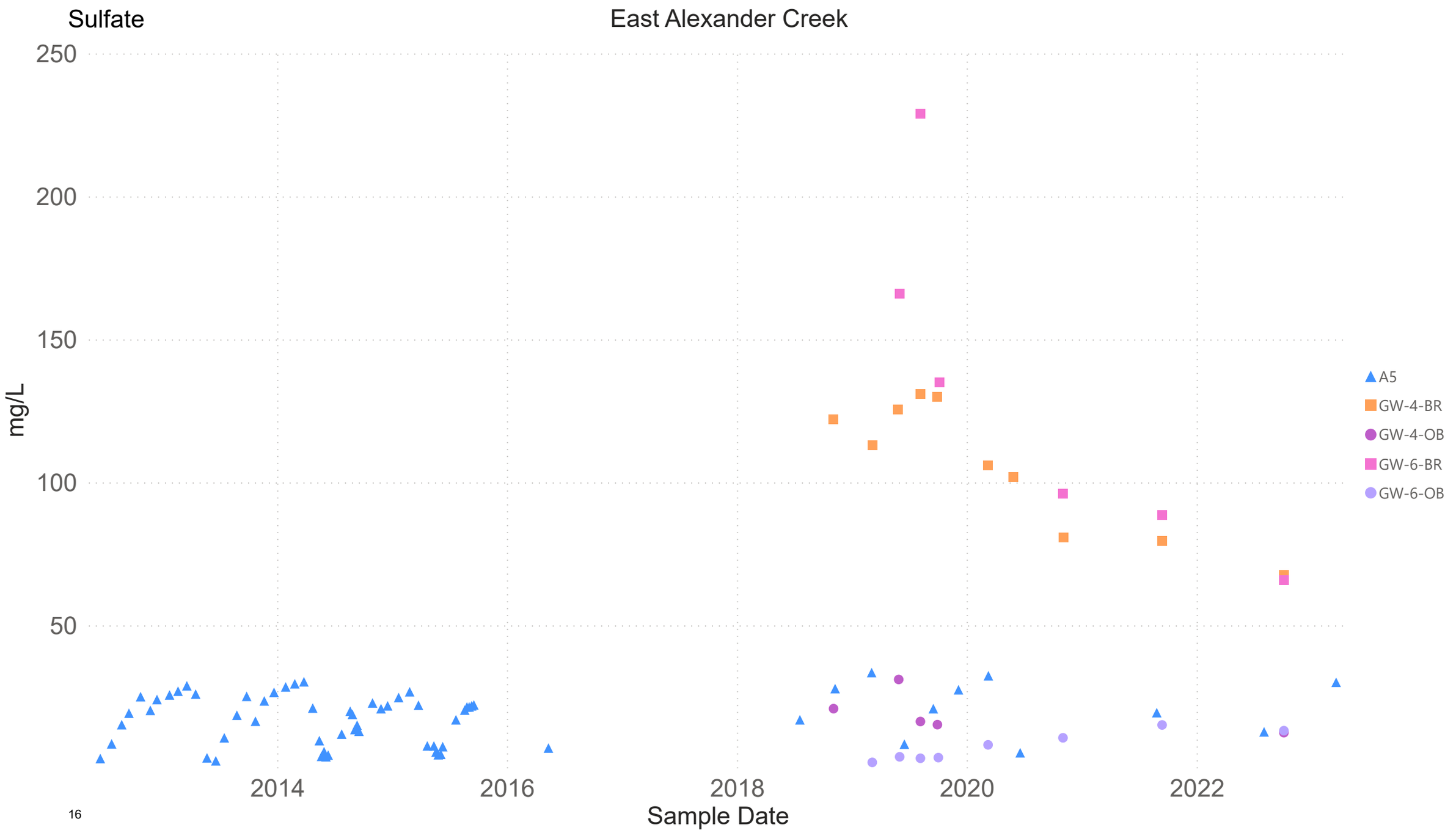

Dissolved Cadmium
West Alexander Creek
0.00010
5.00000E-5
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1

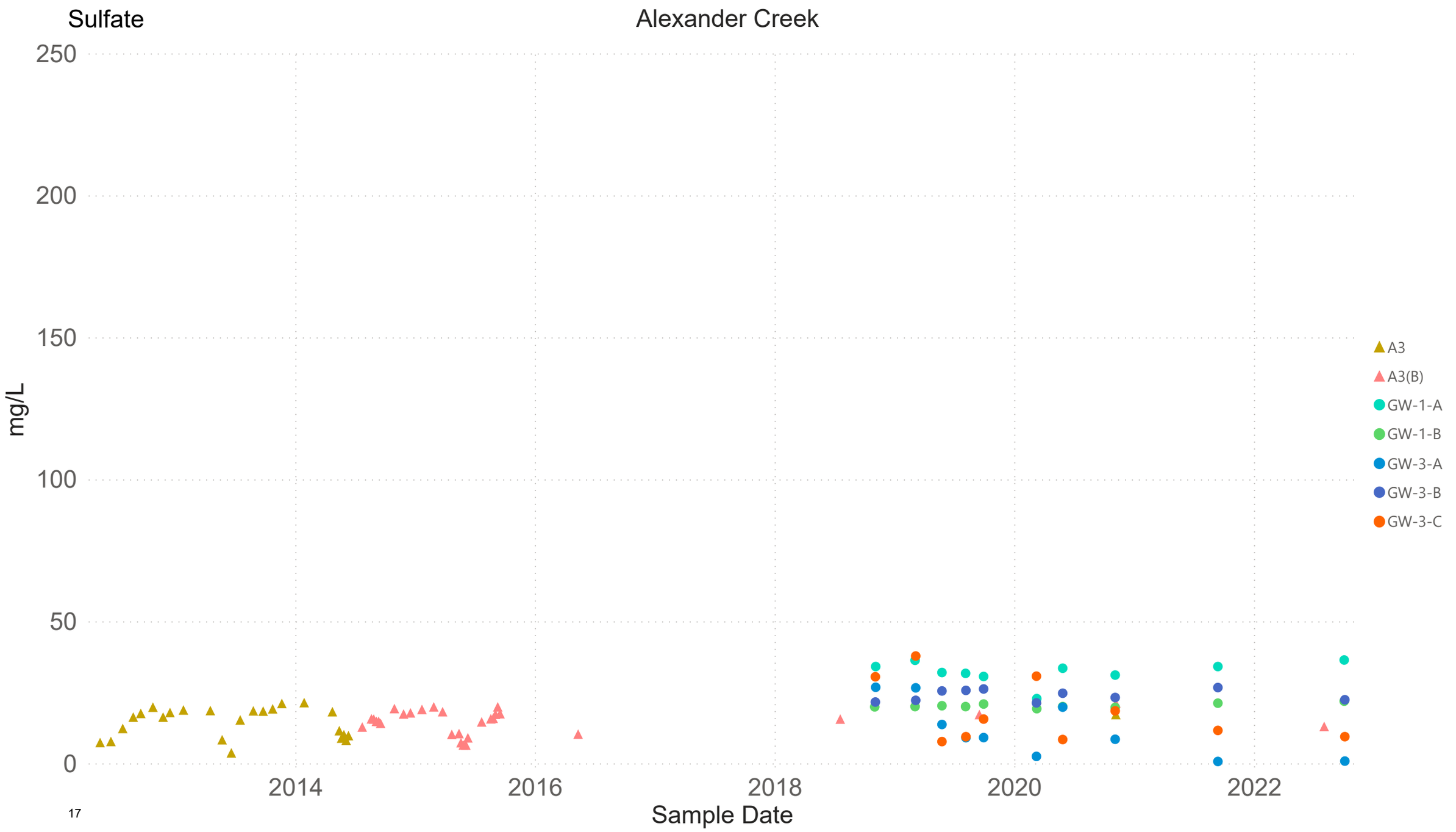

Dissolved Cadmium
East Alexander Creek
0.00010
5.00000E-5
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

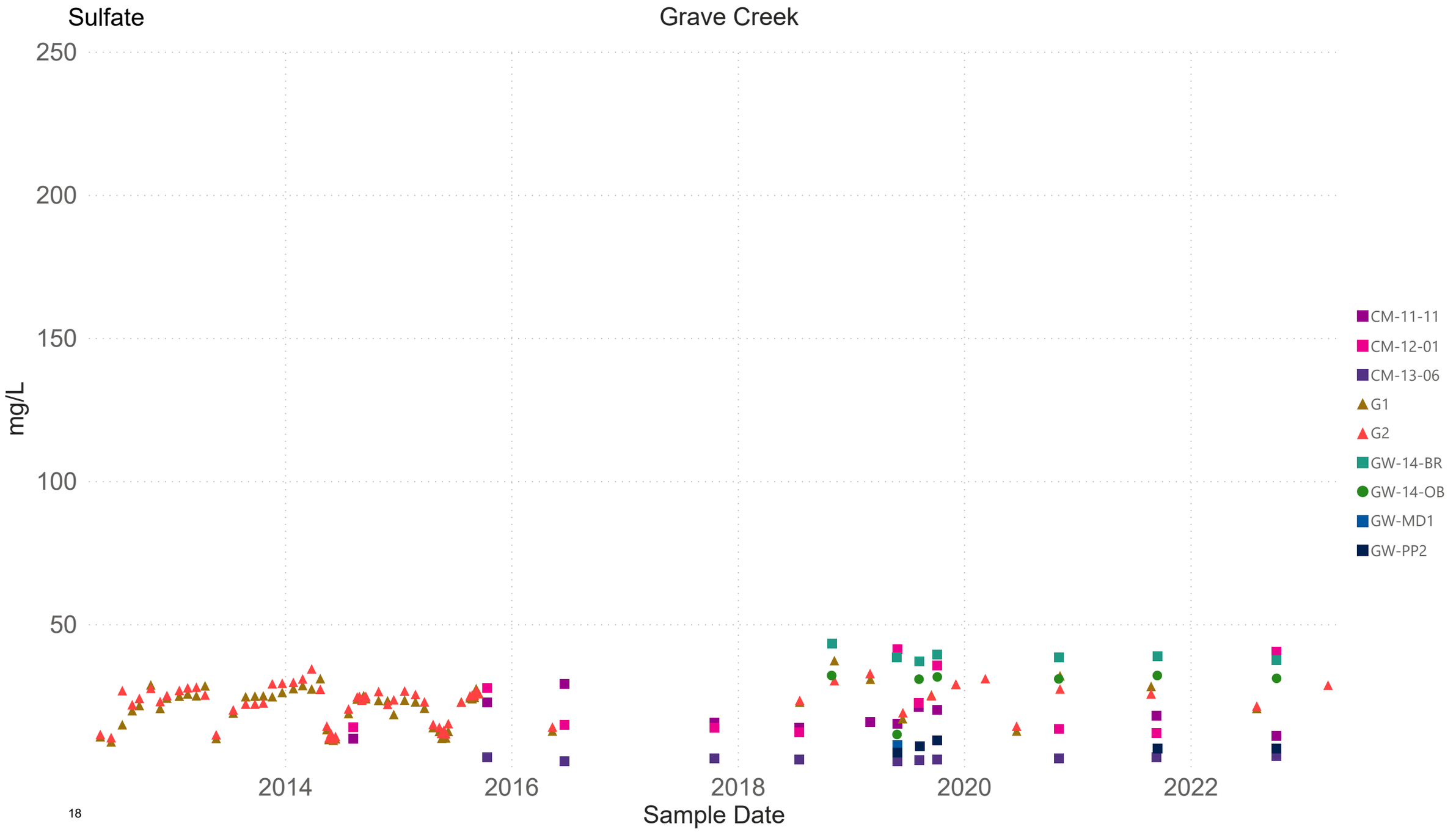

Dissolved Cadmium
Alexander Creek
0.00010
5.00000E-5
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C


Dissolved Cadmium
Grave Creek
0.00010
5.00000E-5
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2


Sulfate
West Alexander Creek
250
200
150
100
50
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-13-25
GW-12-BR
GW-7-A
GW-7-B
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1

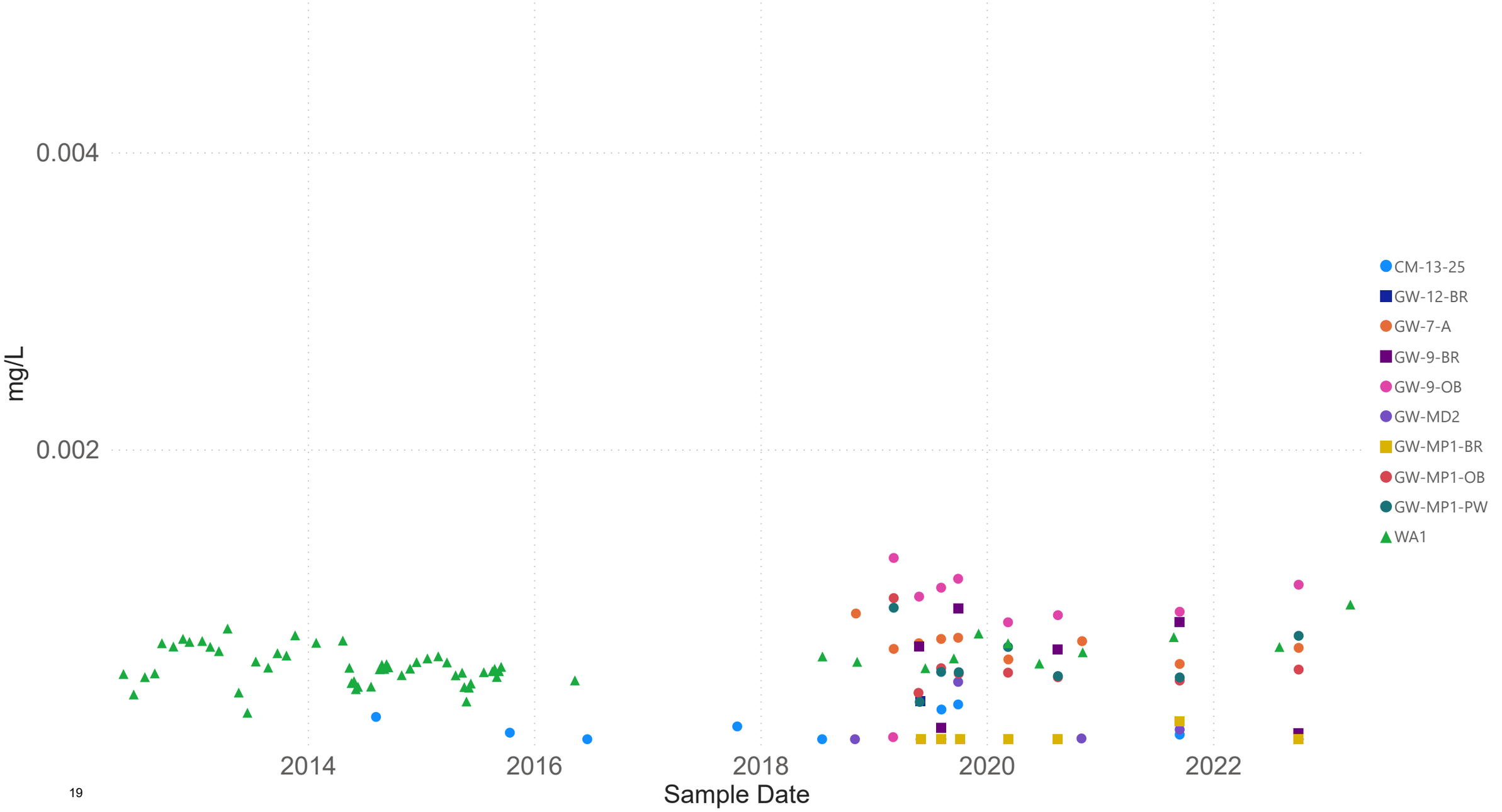

Sulfate
East Alexander Creek
250
200
150
100
50
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

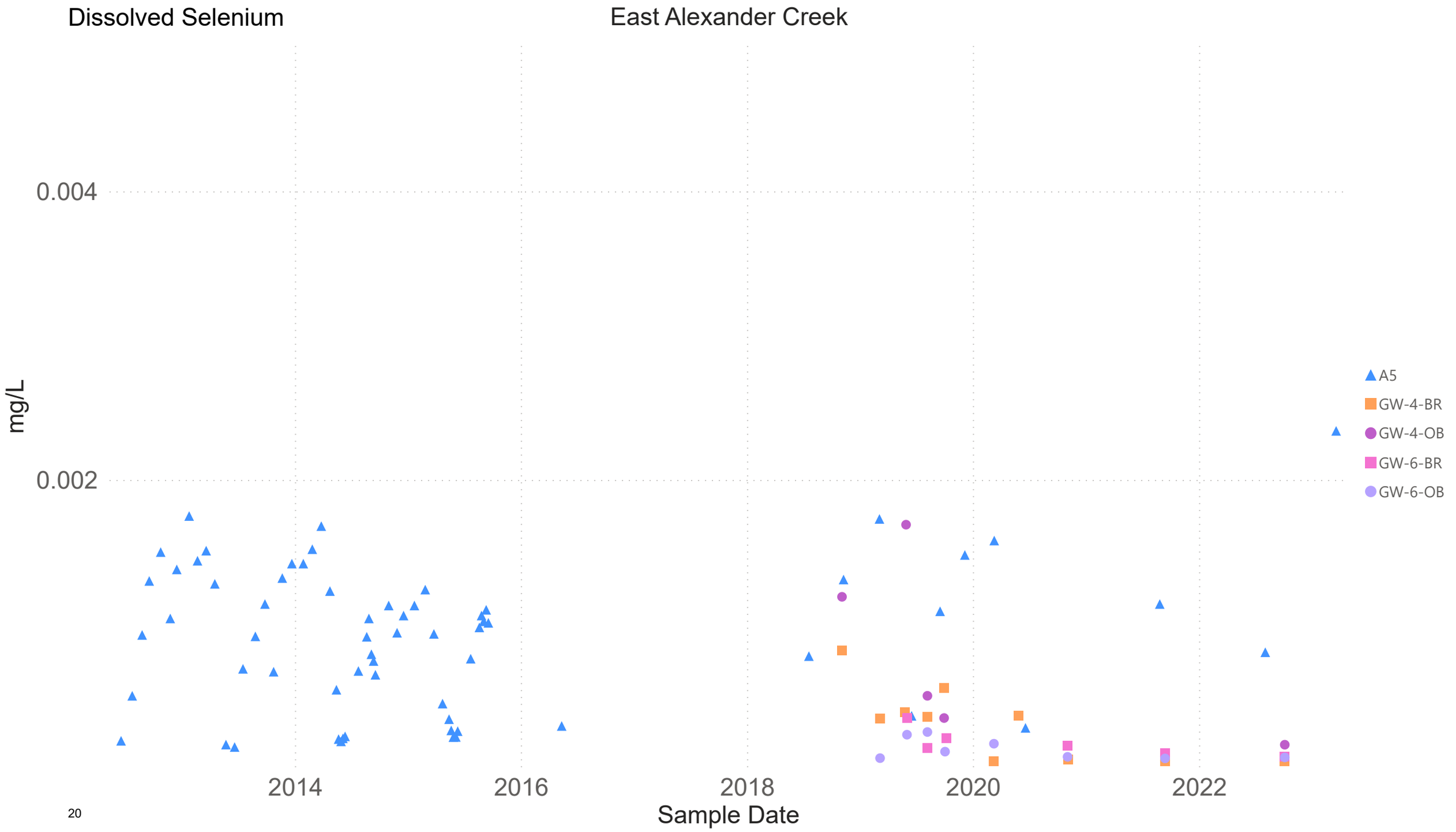

Sulfate
Alexander Creek
250
200
150
100
50
0
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C

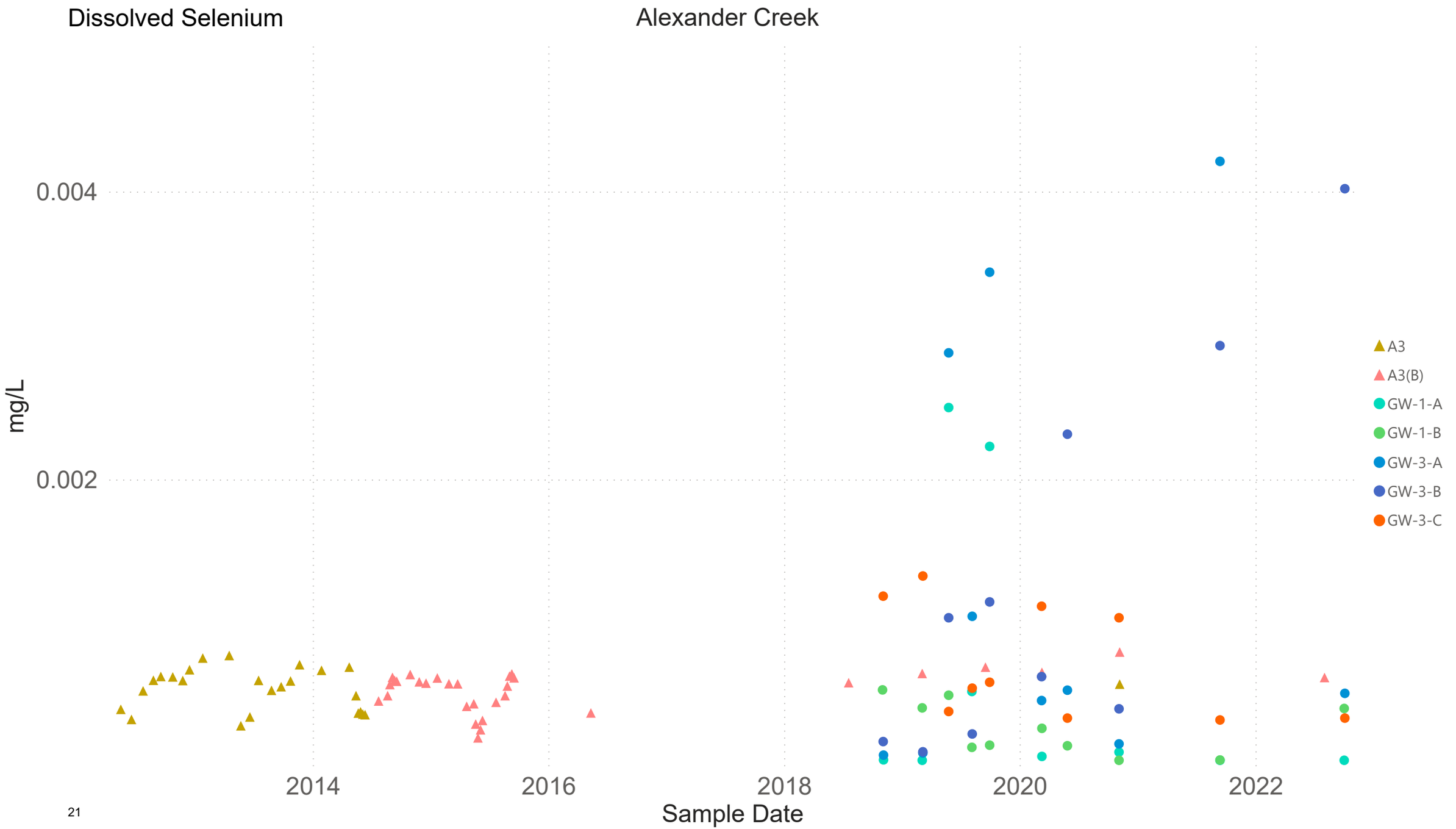

Sulfate
Grave Creek
250
200
150
100
50
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2

Dissolved Selenium

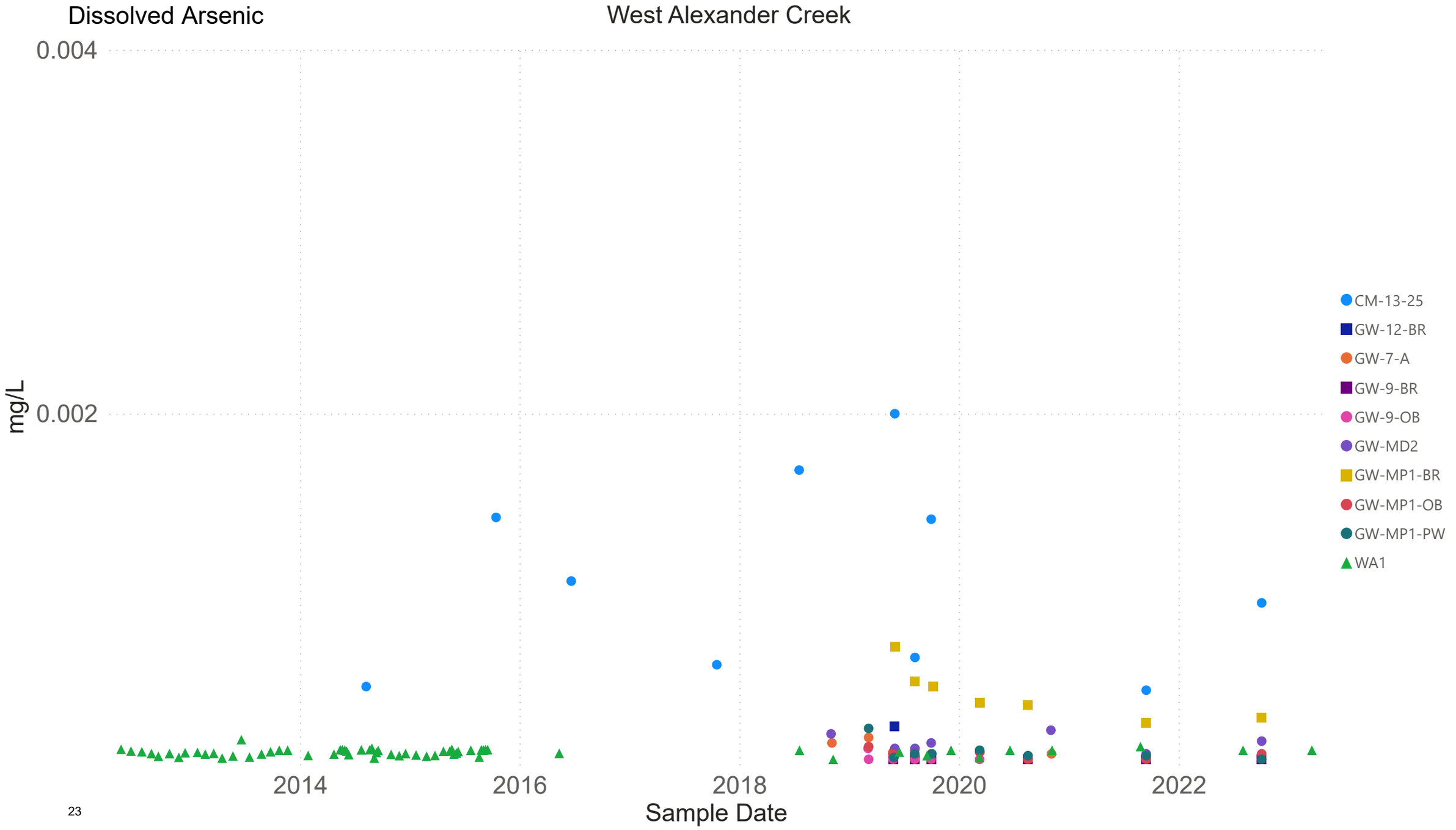
West Alexander Creek

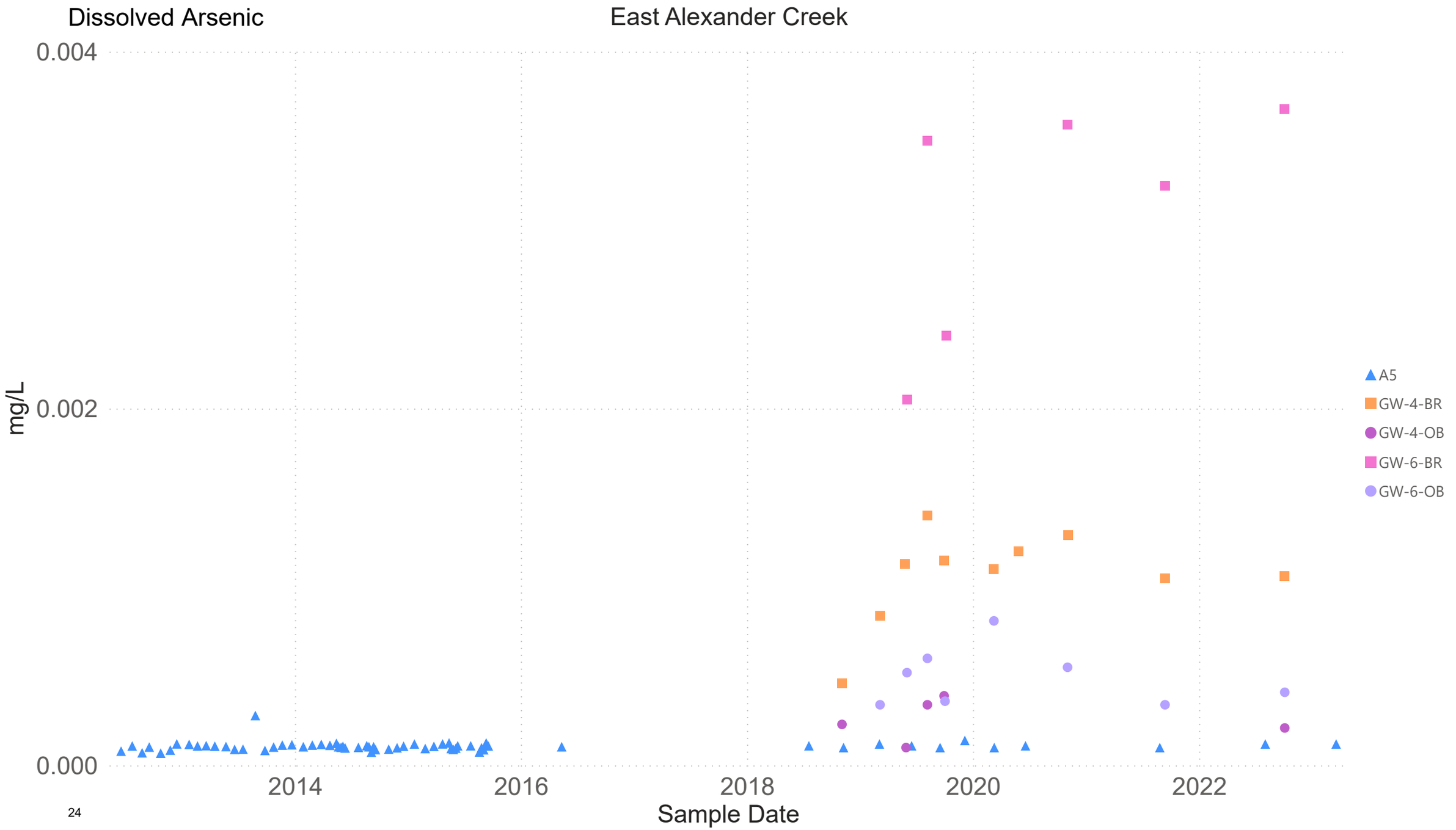


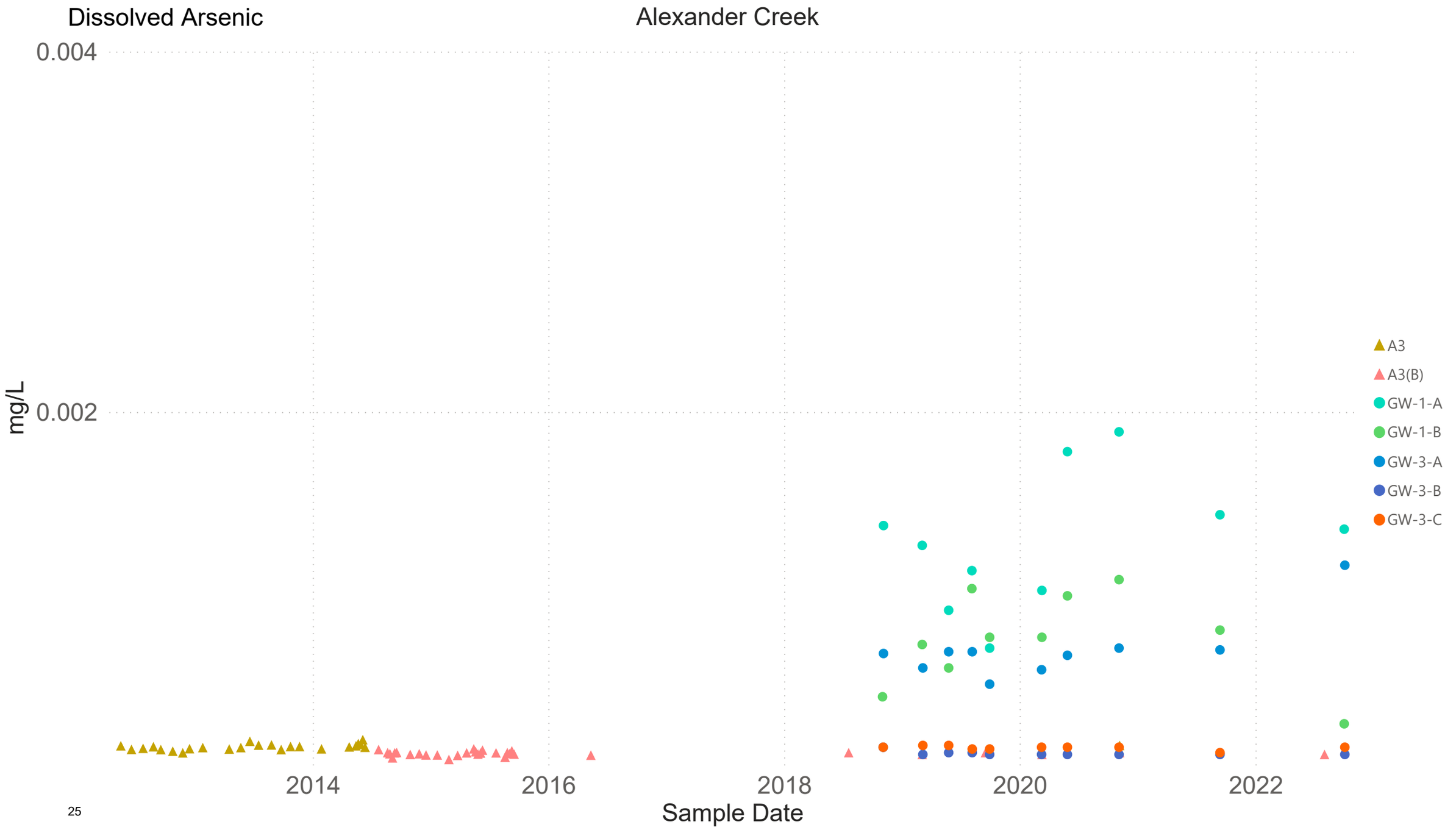

Dissolved Selenium
East Alexander Creek
0.004
0.002
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

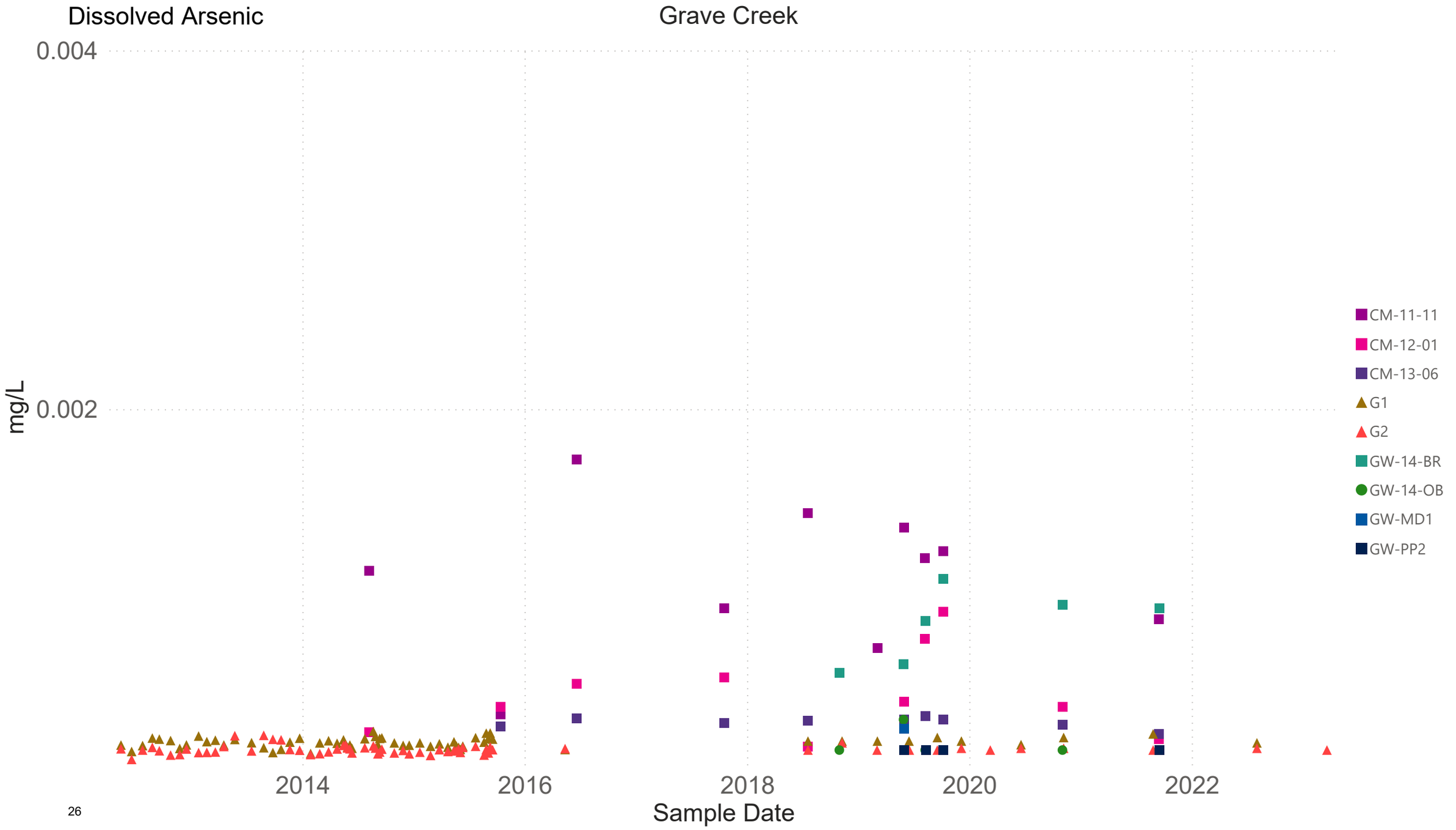

Dissolved Selenium
Alexander Creek
0.004
0.002
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C

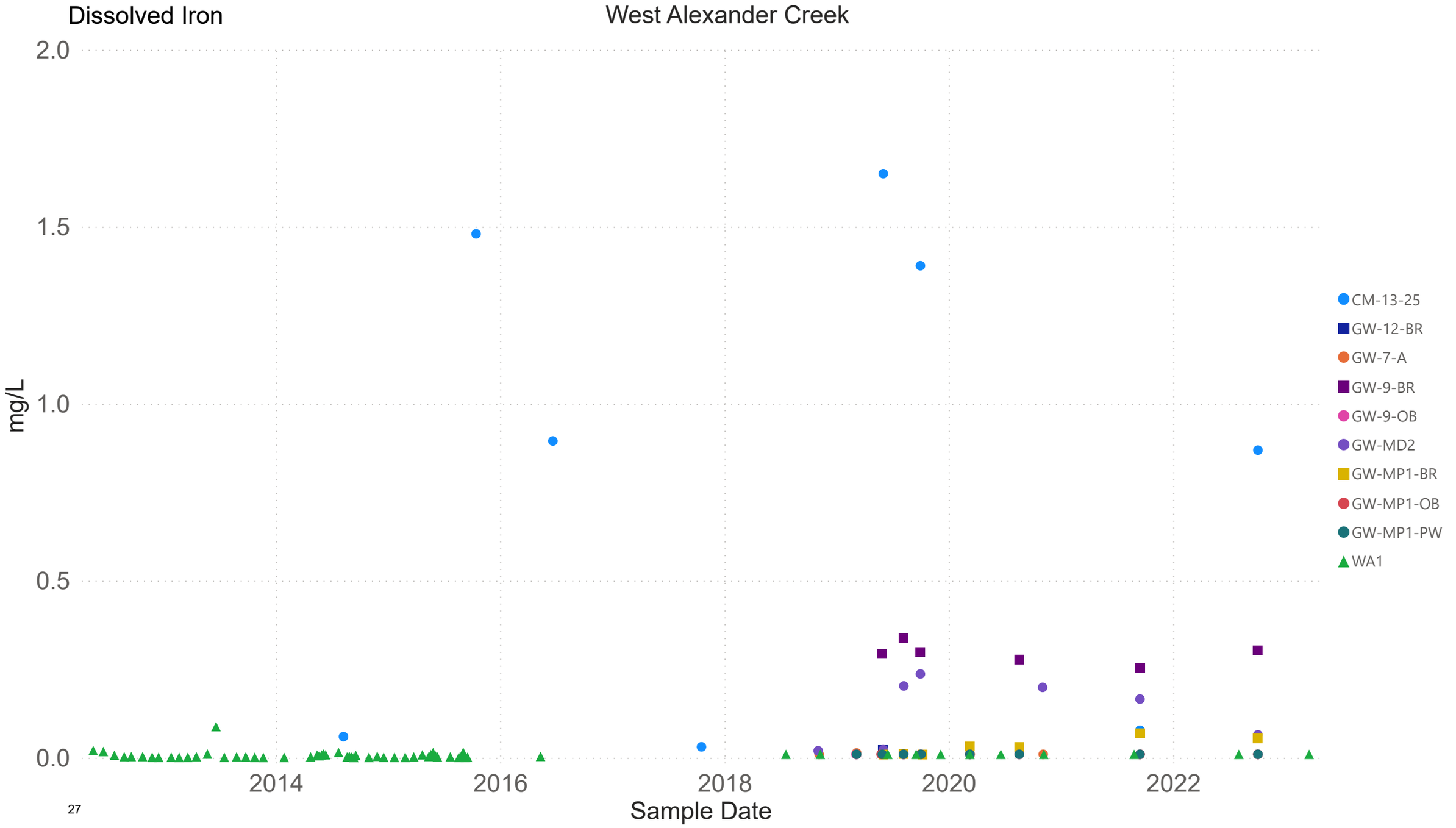

Dissolved Selenium
Grave Creek
0.004
0.002
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2

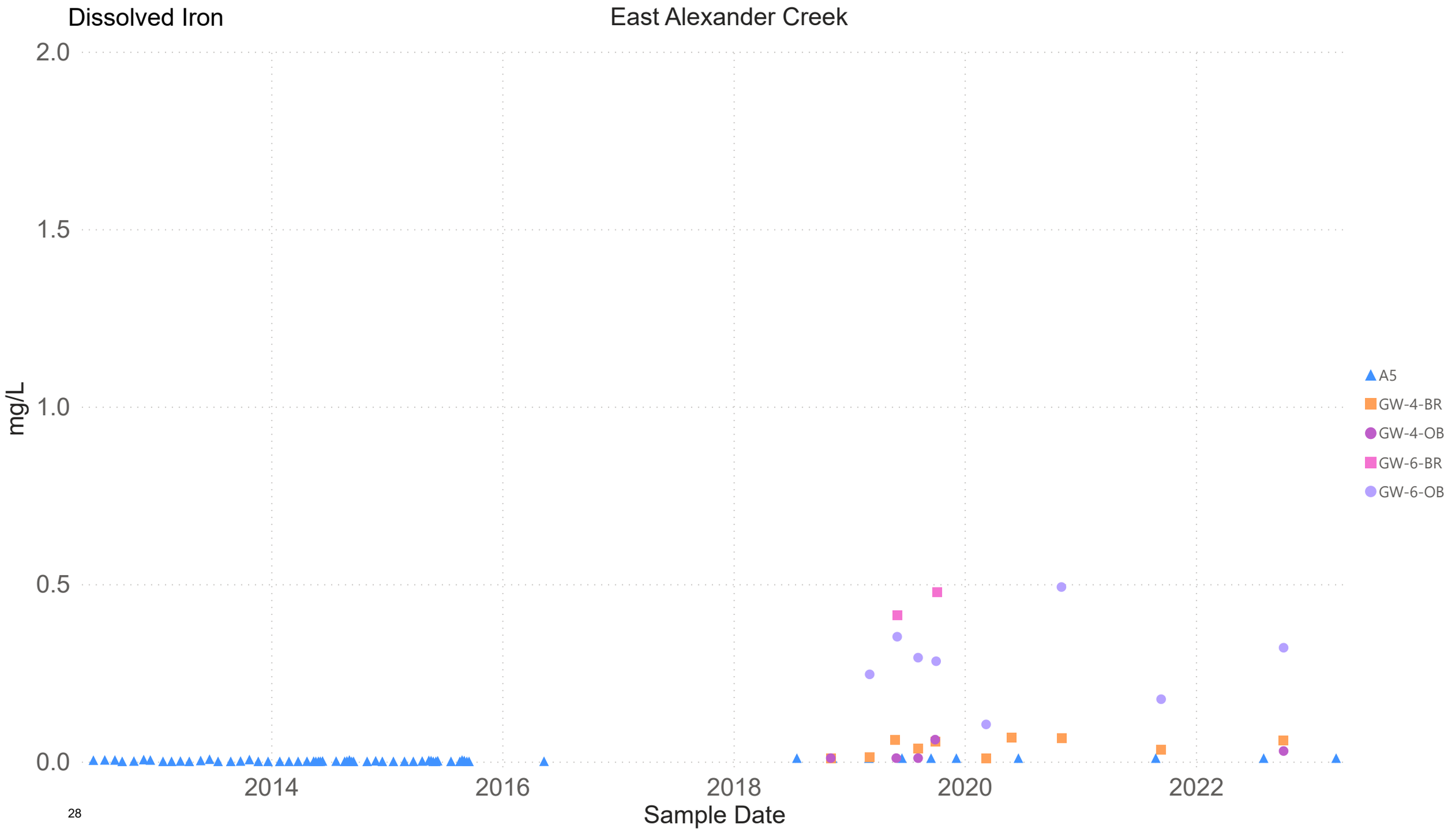

Dissolved Arsenic
West Alexander Creek
0.004
0.002
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1

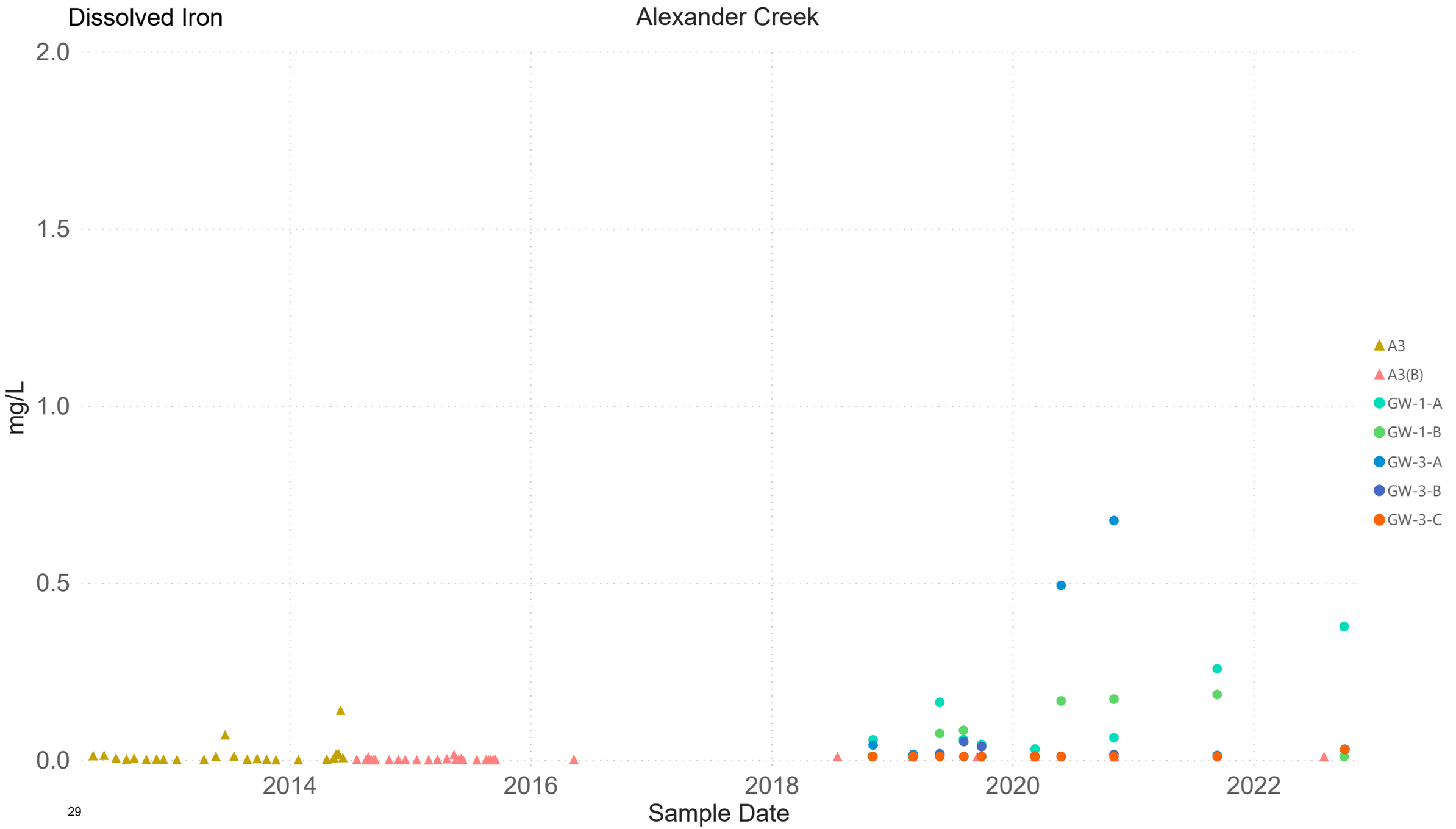

Dissolved Arsenic
East Alexander Creek
0.004
0.002
0.000
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

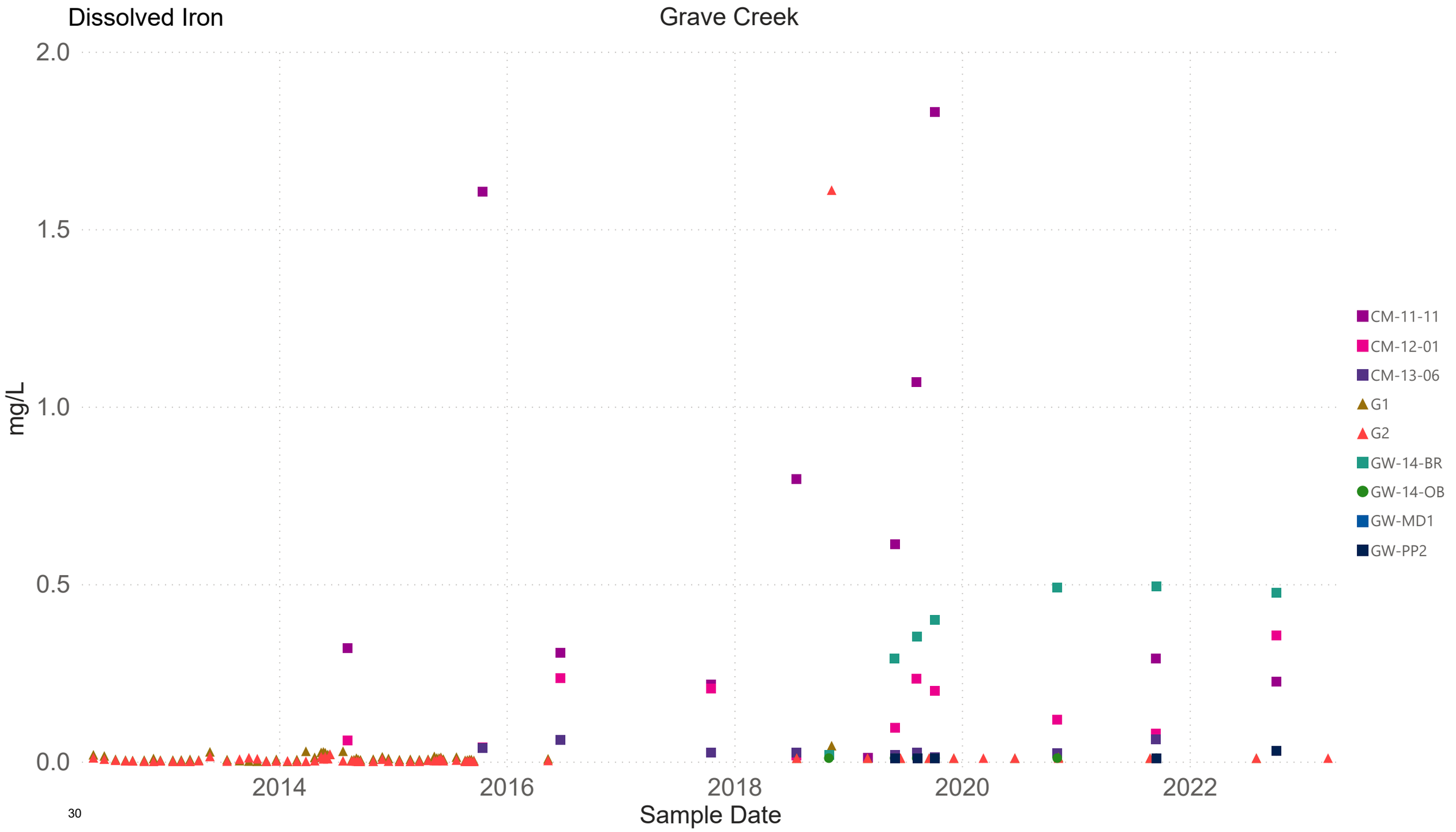

Dissolved Arsenic
Alexander Creek
0.004
0.002
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C

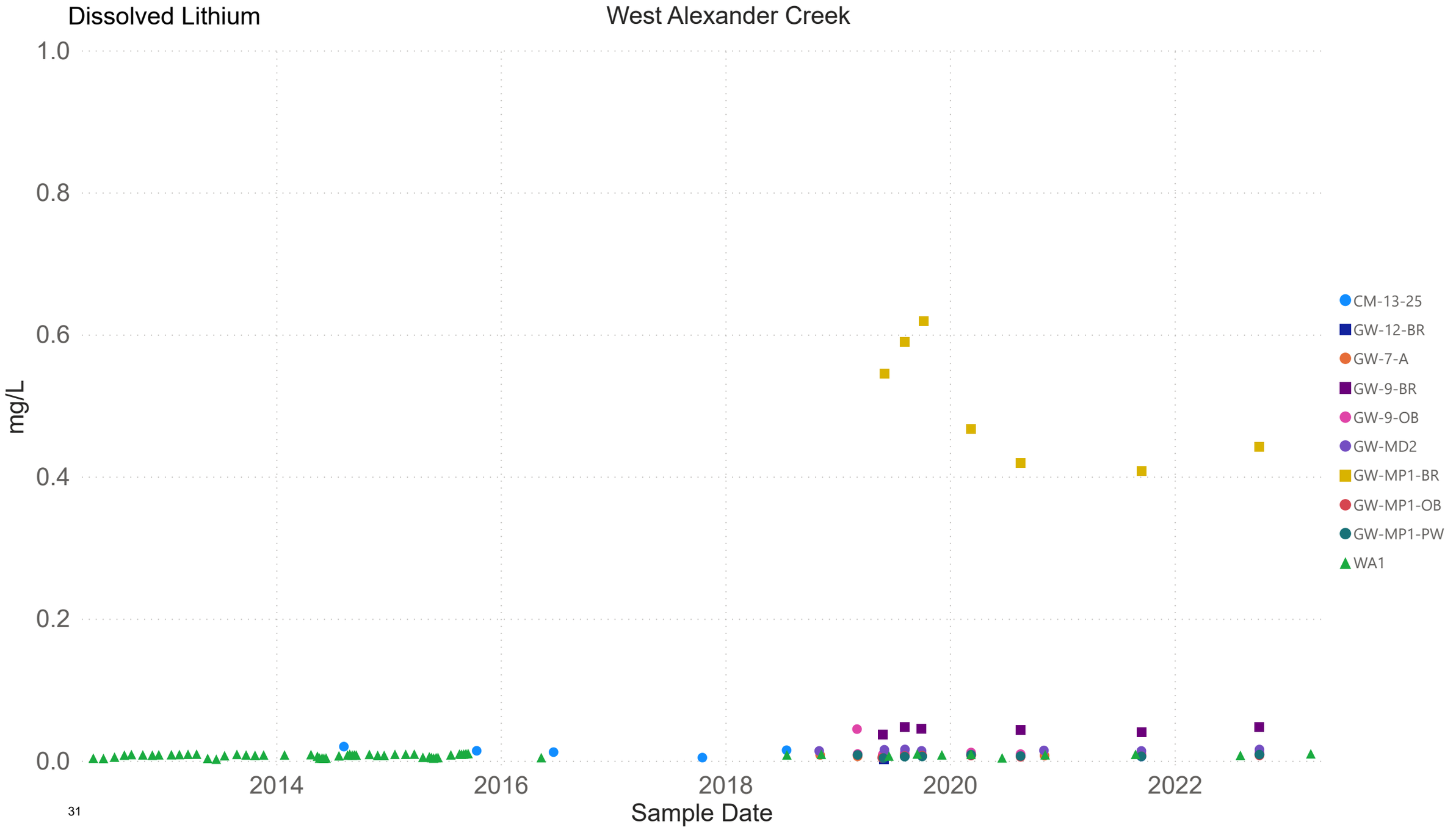

Dissolved Arsenic
Grave Creek
0.004
0.002
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2

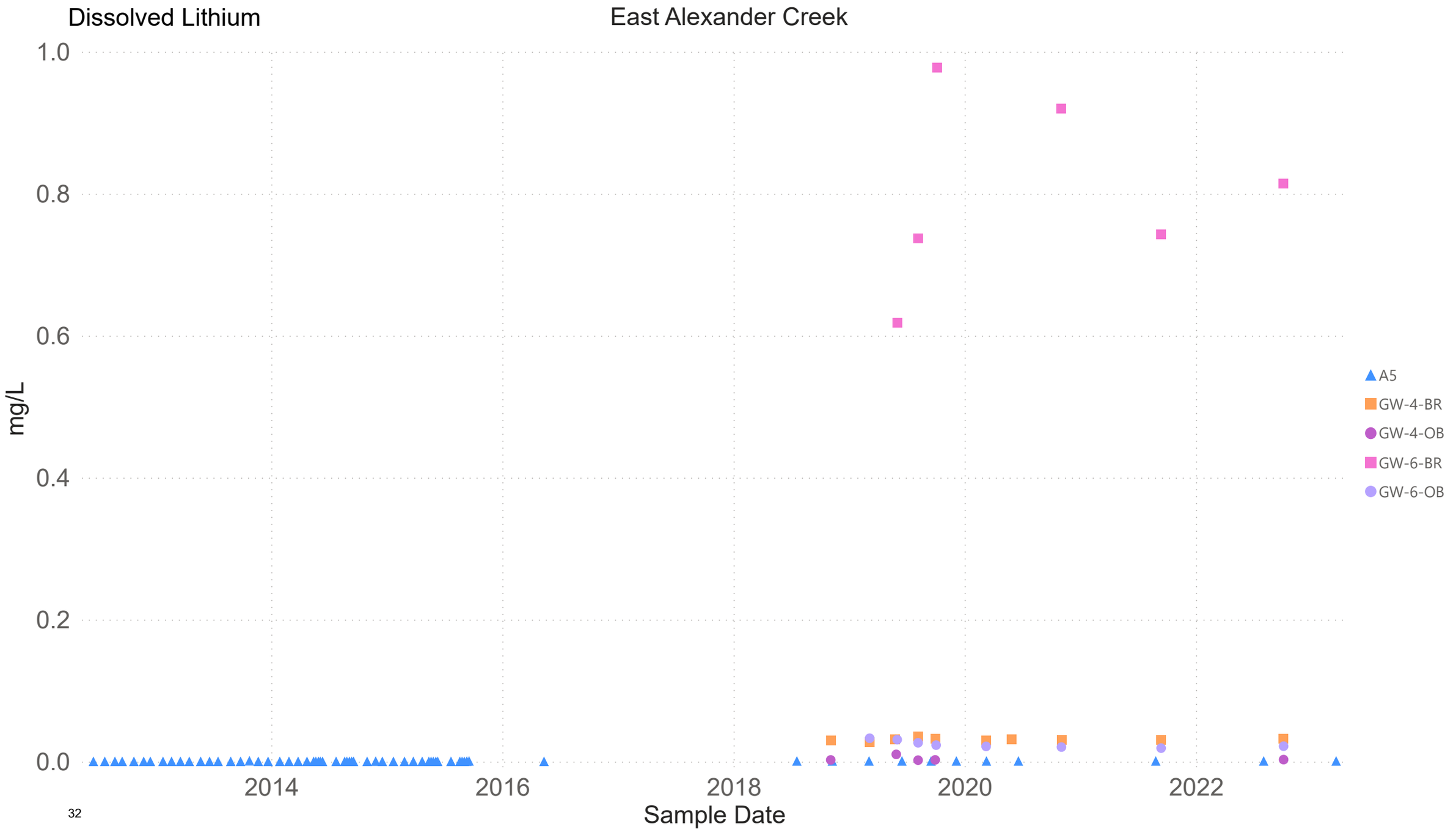

Dissolved Iron
West Alexander Creek
2.0
1.5
1.0
0.5
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1

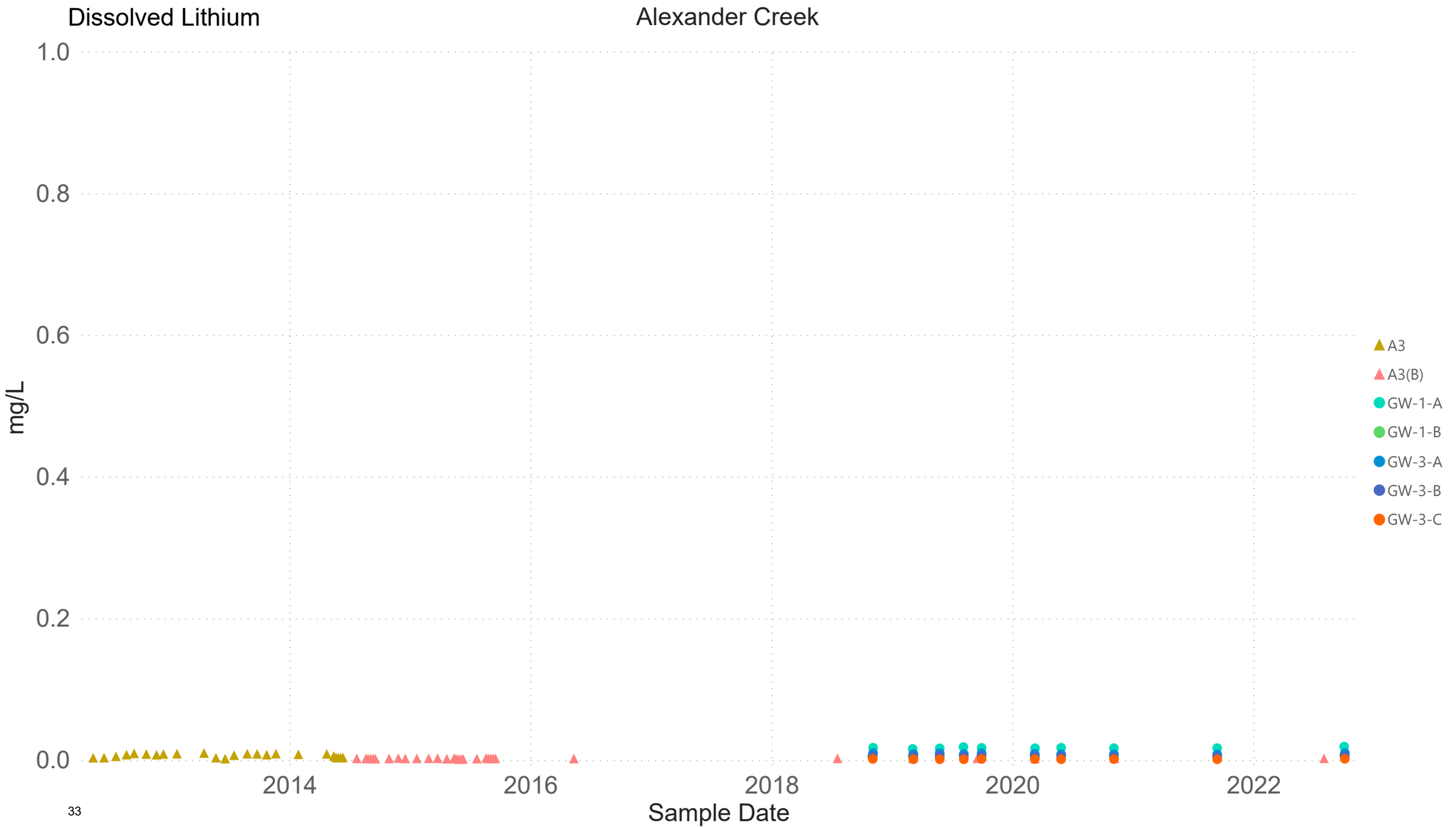

Dissolved Iron
East Alexander Creek
2.0
1.5
1.0
0.5
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

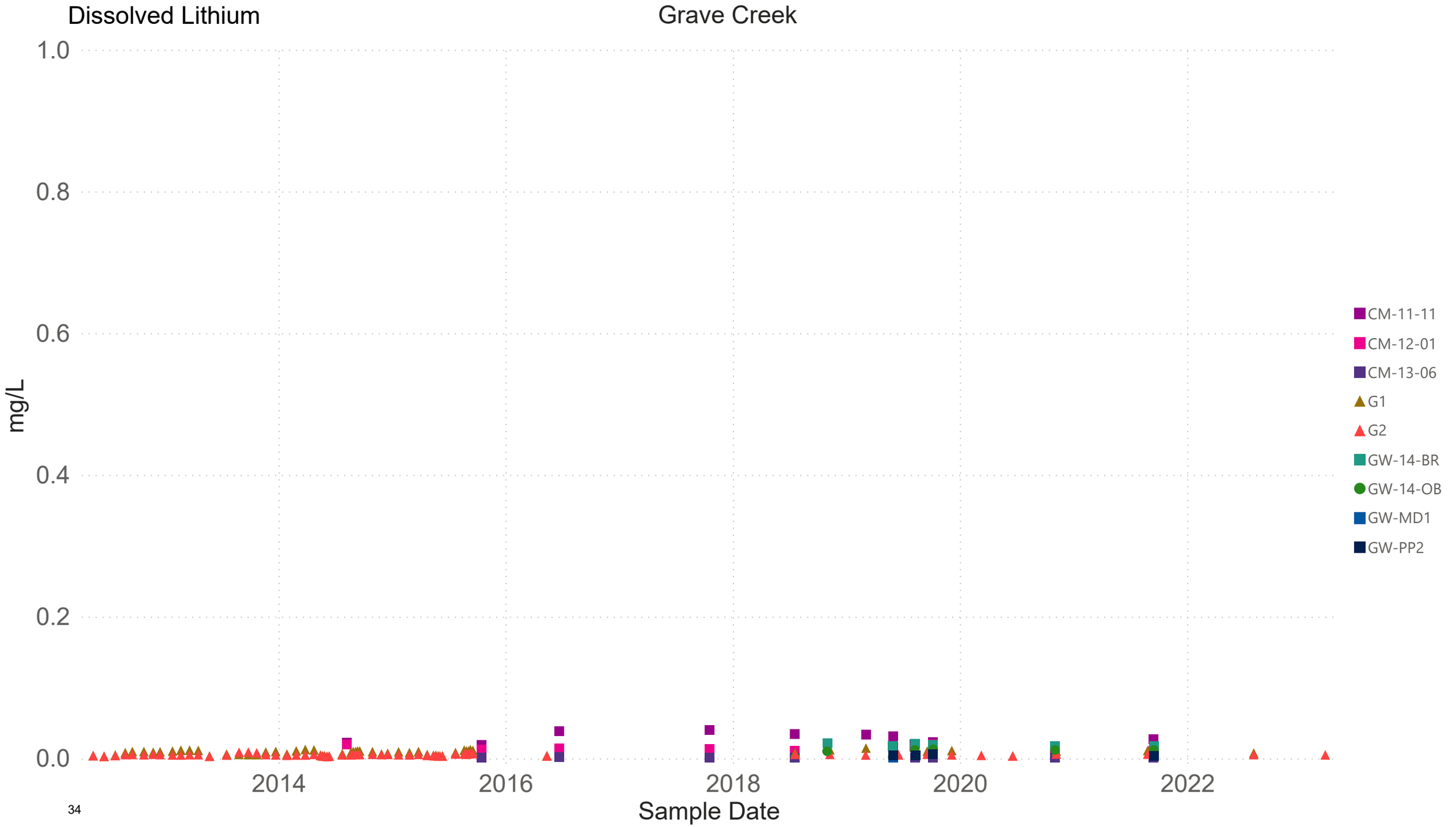

Dissolved Iron
Alexander Creek
2.0
1.5
1.0
0.5
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C


Dissolved Iron
Grave Creek
2.0
1.5
1.0
0.5
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2


Dissolved Lithium
West Alexander Creek
1.0
0.8
0.6
0.4
0.2
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1

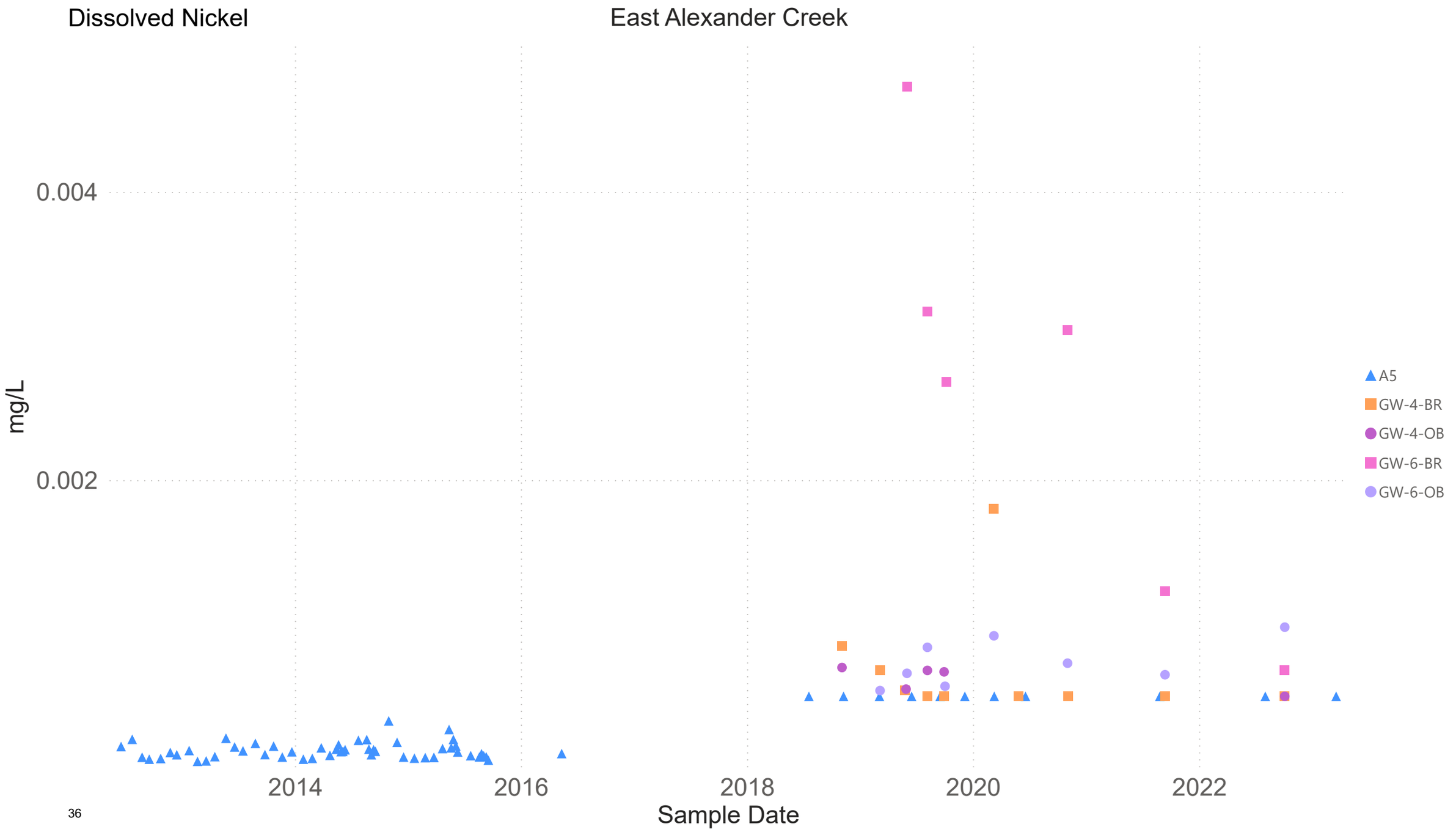

Dissolved Lithium
East Alexander Creek
1.0
0.8
0.6
0.4
0.2
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

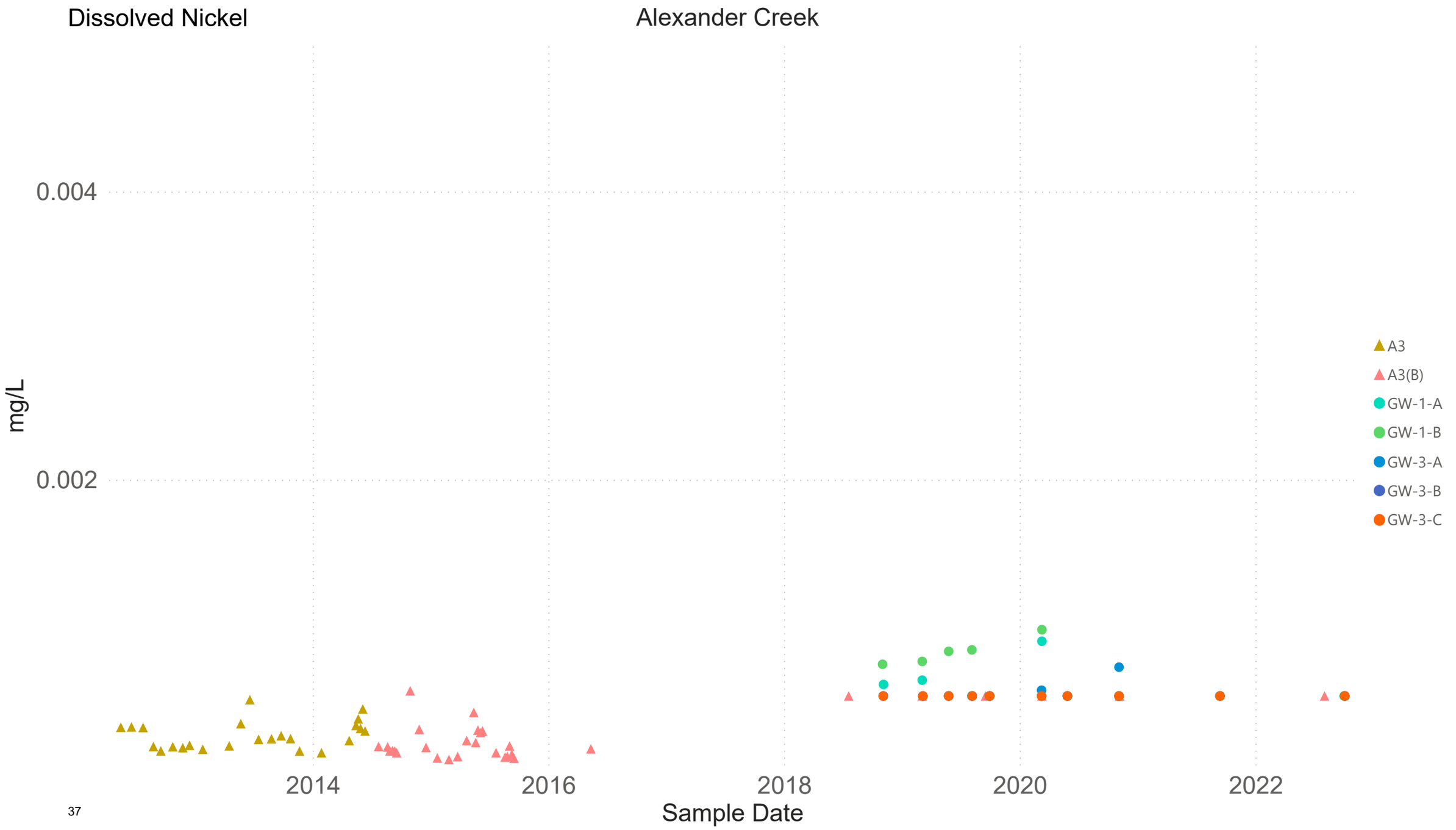

Dissolved Lithium
Alexander Creek
1.0
0.8
0.6
0.4
0.2
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C

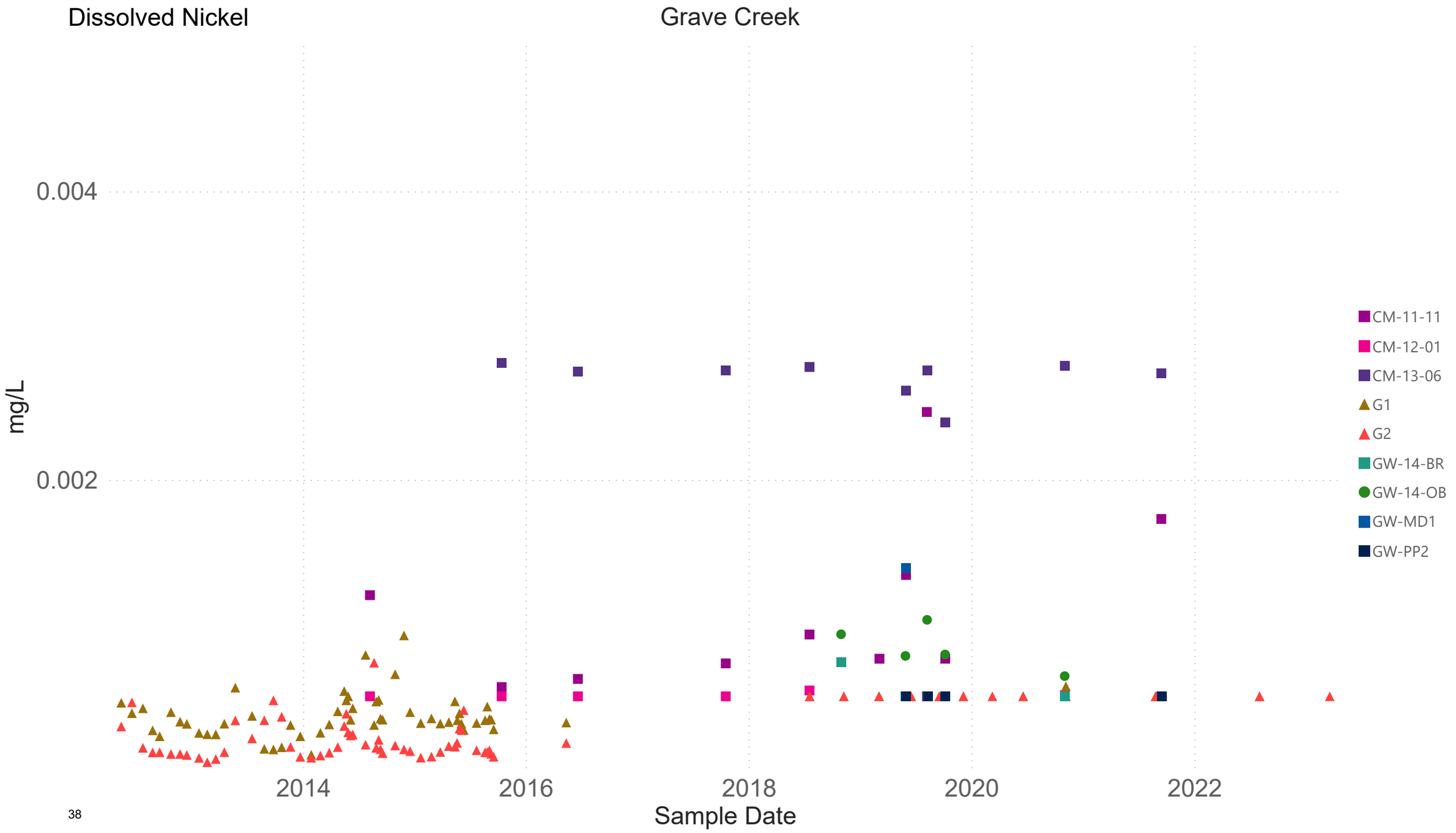

Dissolved Lithium
Grave Creek
1.0
0.8
0.6
0.4
0.2
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2

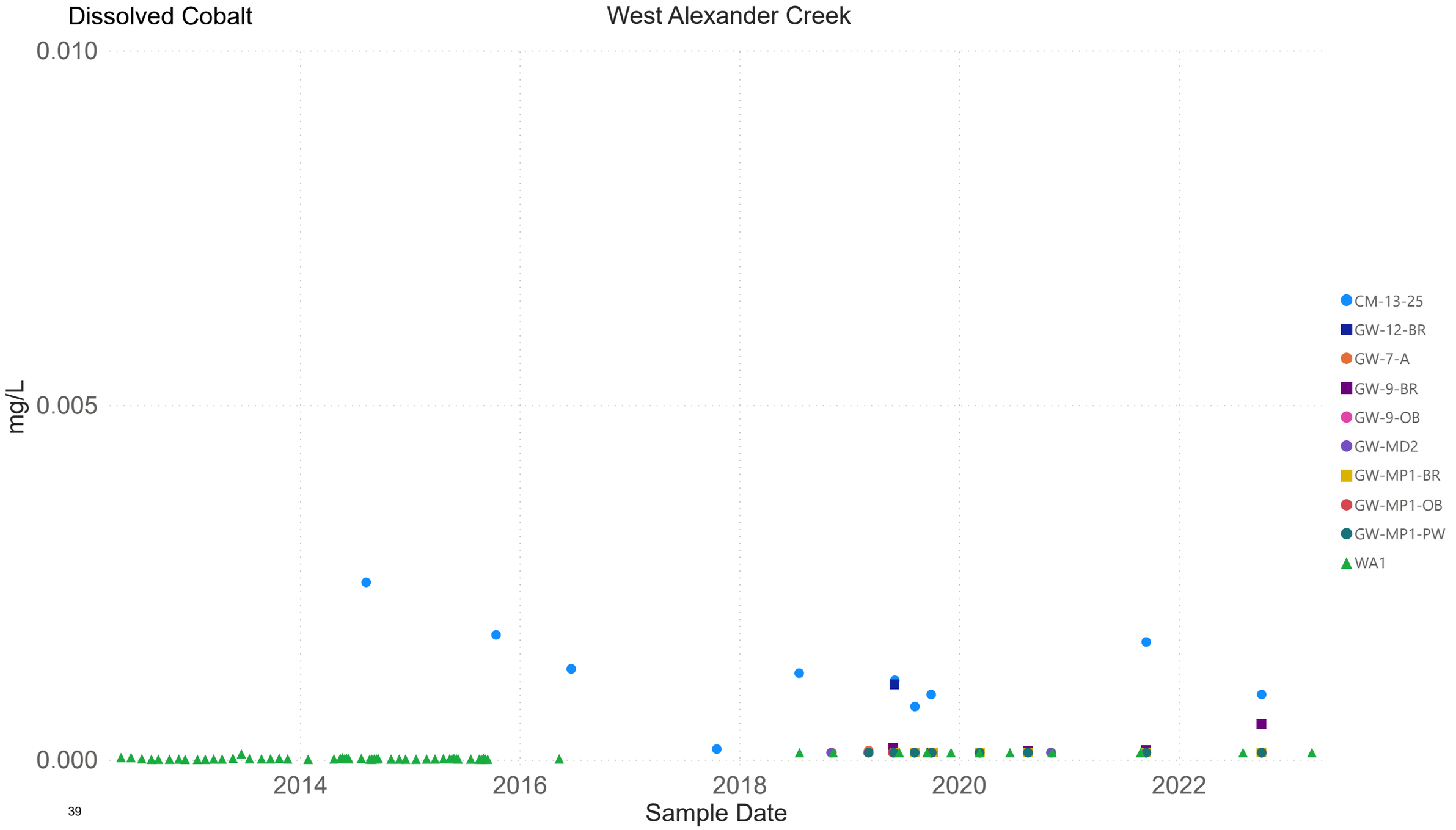
Dissolved Nickel

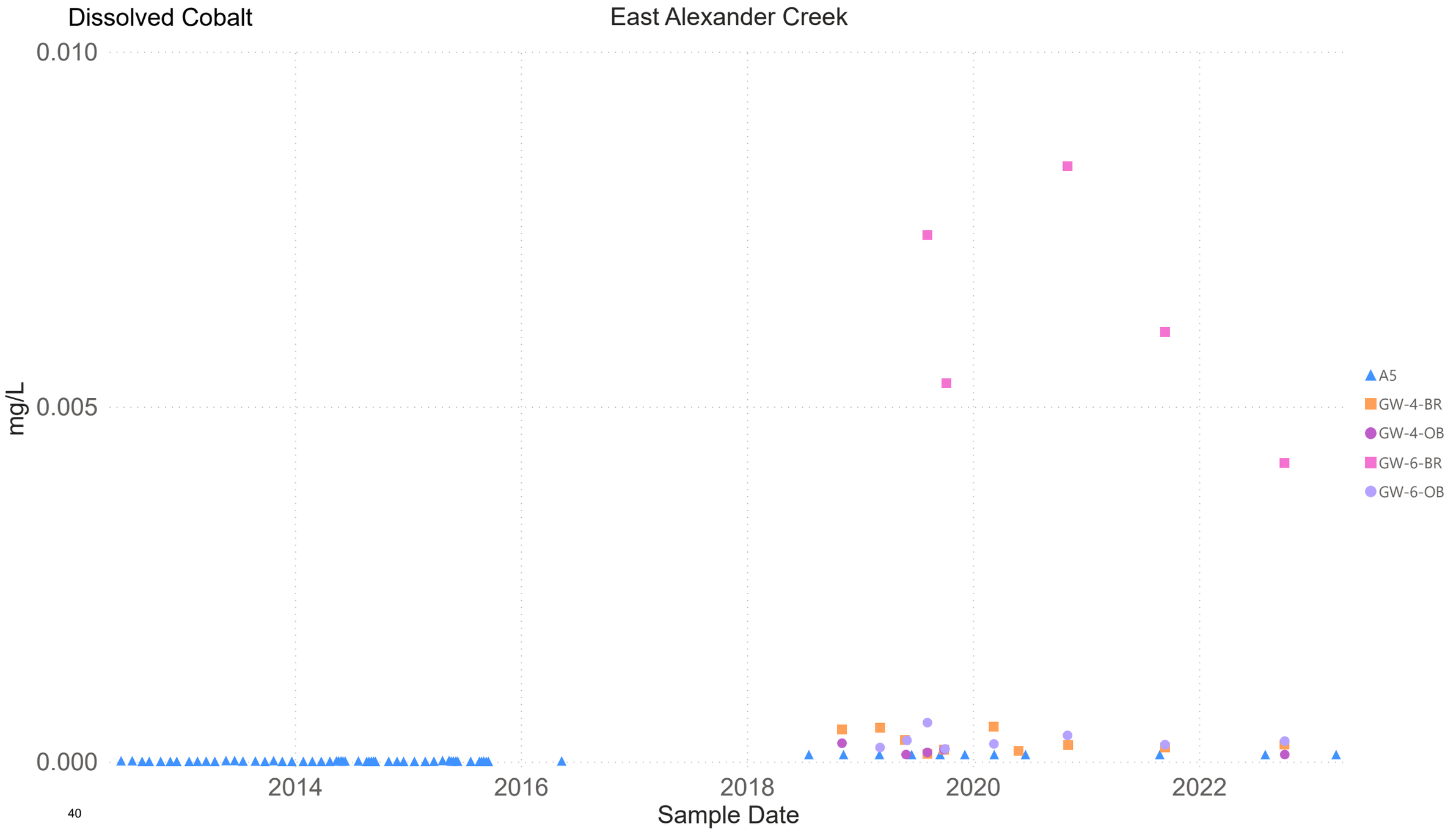
West Alexander Creek

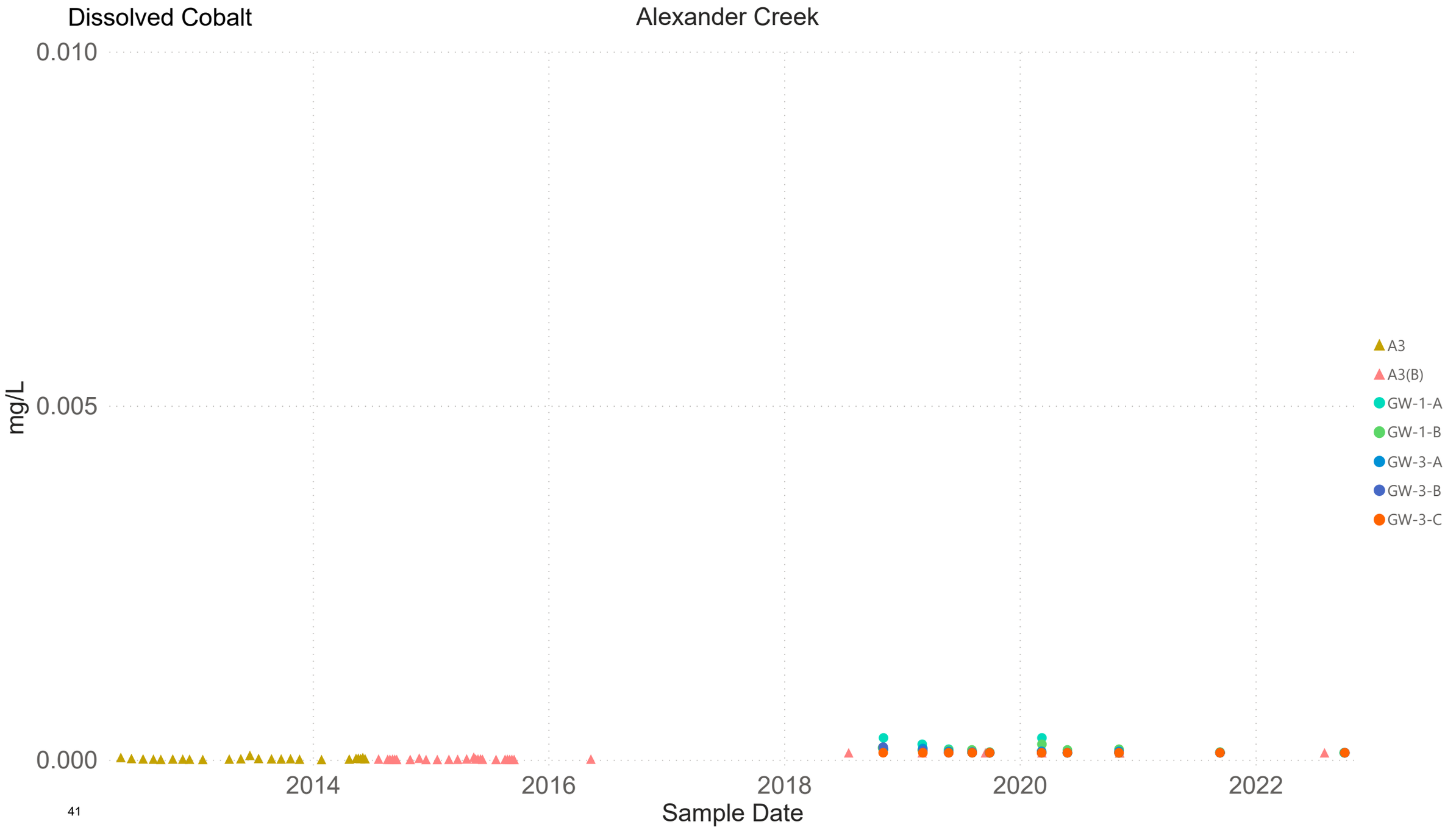

Dissolved Nickel
East Alexander Creek
0.004
0.002
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

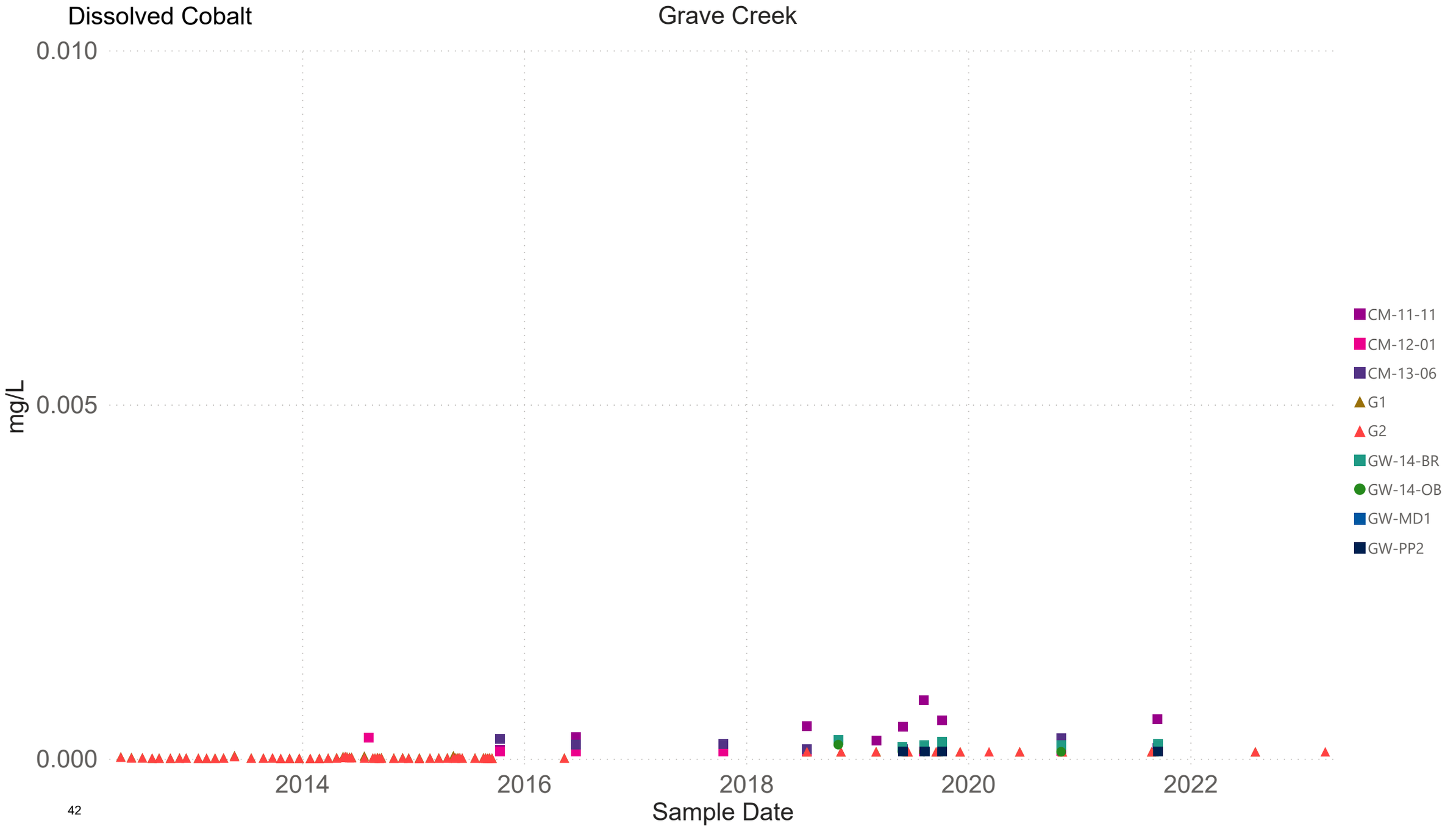

Dissolved Nickel
Alexander Creek
0.004
0.002
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C

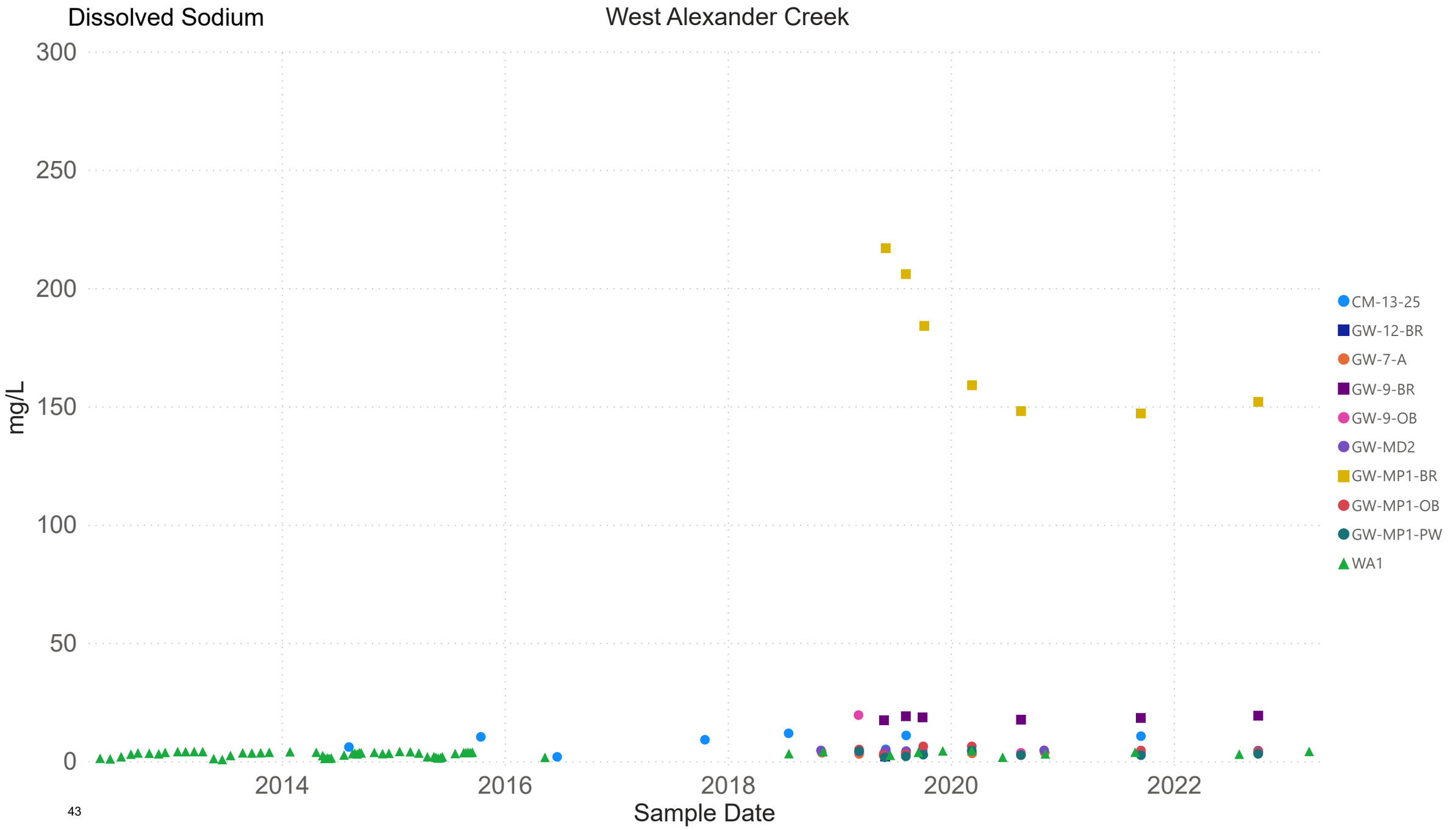

Dissolved Nickel
Grave Creek
0.004
0.002
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2

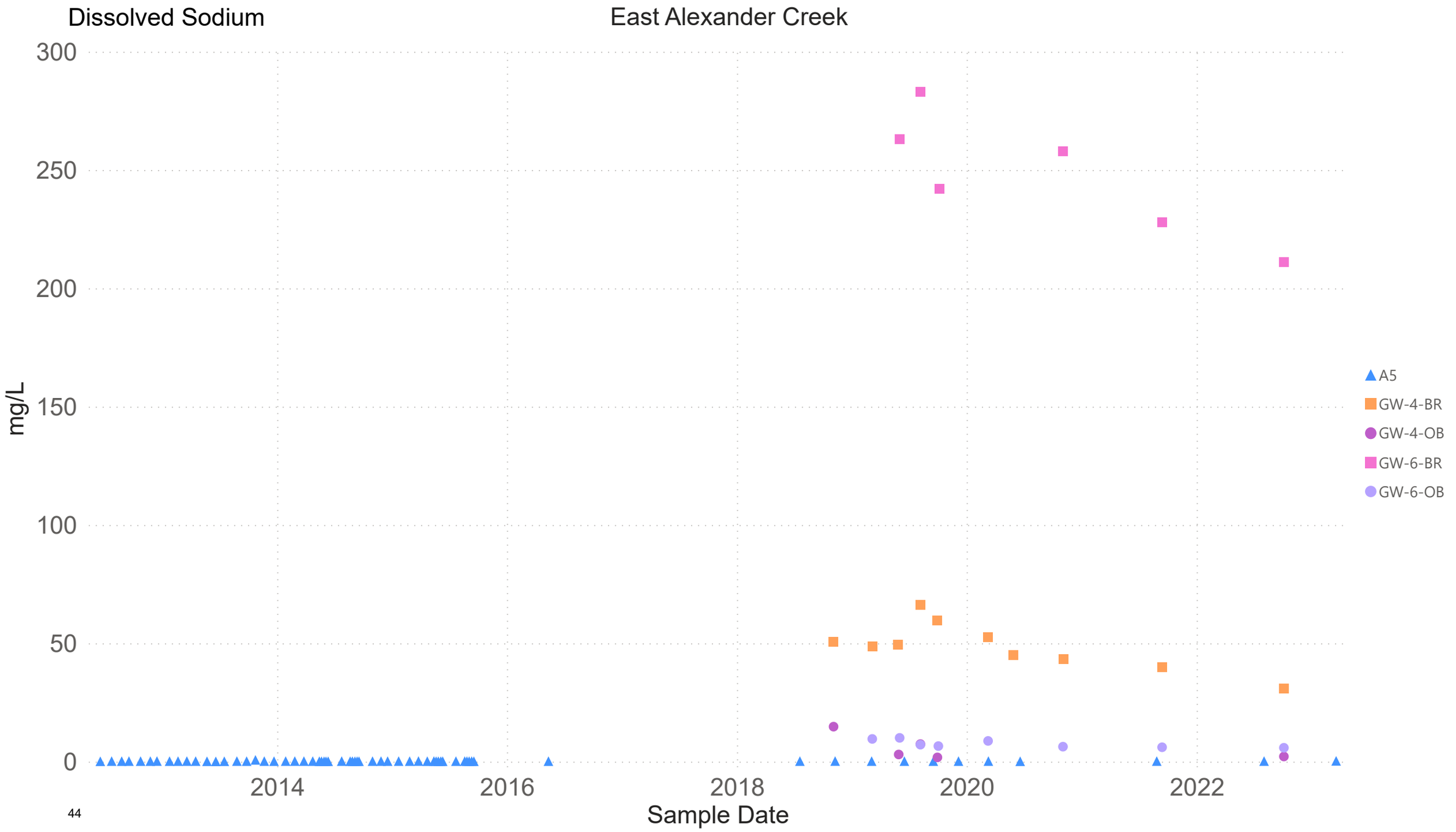

Dissolved Cobalt
West Alexander Creek
0.010
0.005
0.000
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1

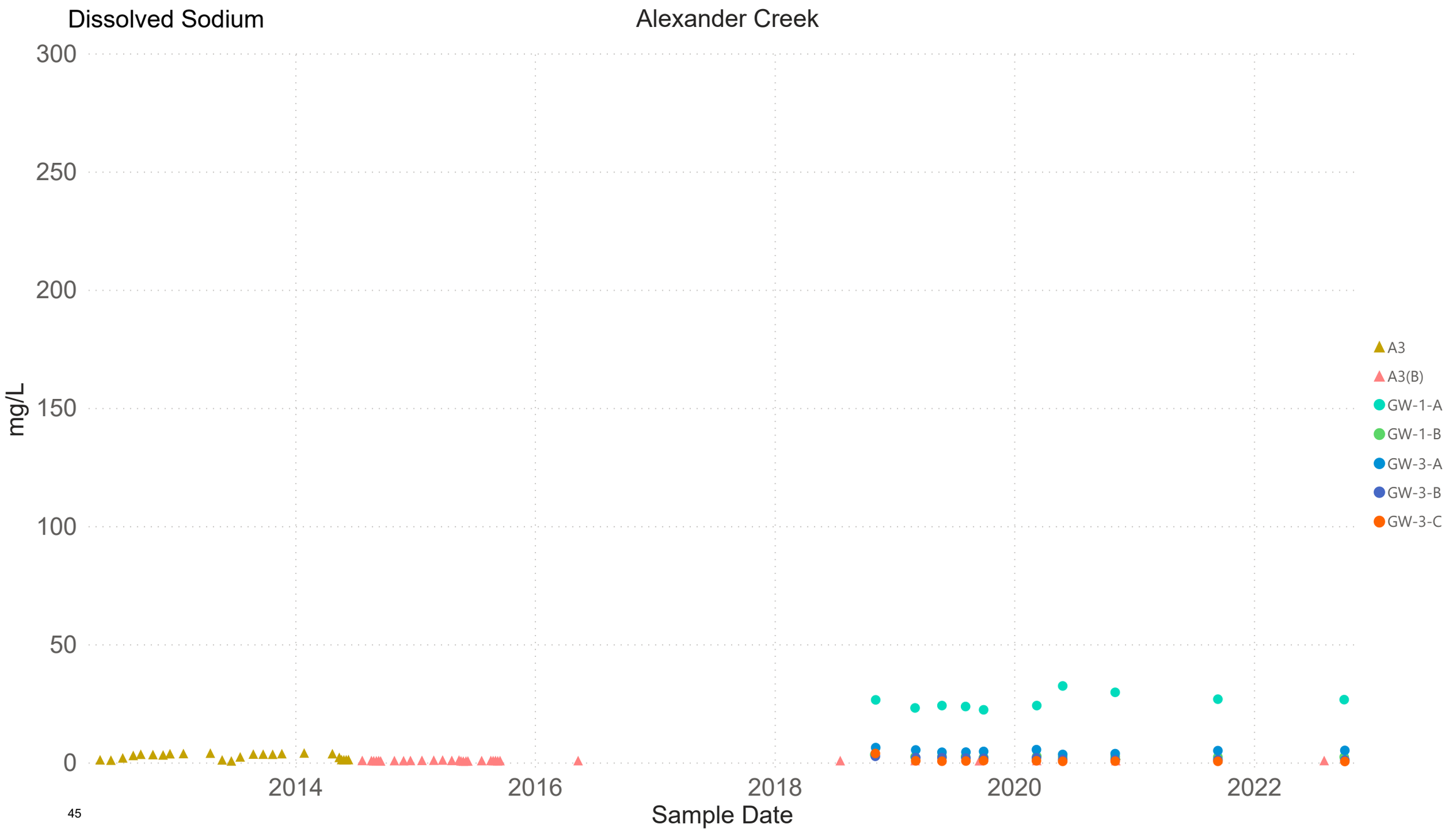

Dissolved Cobalt
East Alexander Creek
0.010
0.005
0.000
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

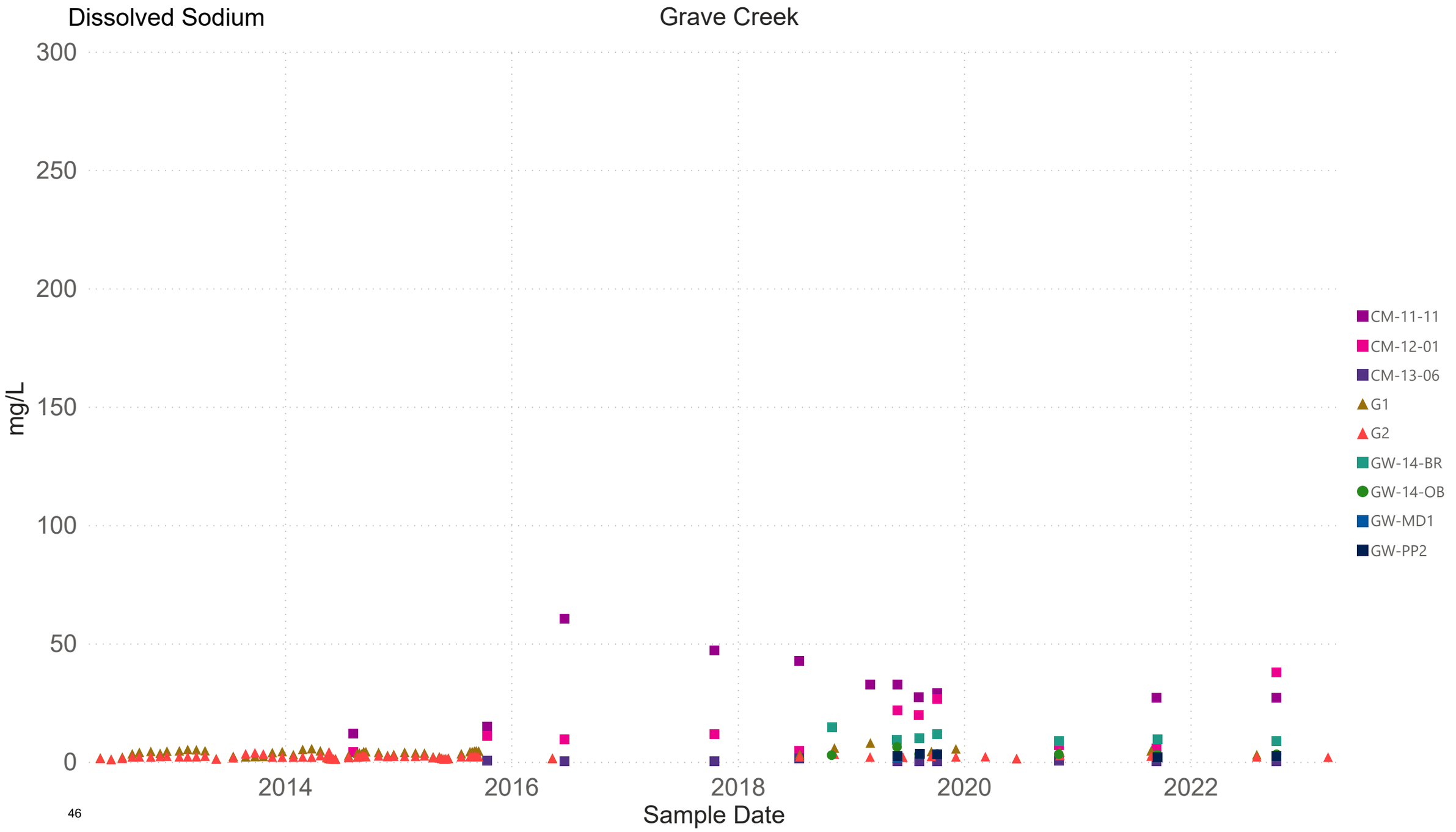

Dissolved Cobalt
Alexander Creek
0.010
0.005
0.000
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C


Dissolved Cobalt
Grave Creek
0.010
0.005
0.000
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2


Dissolved Sodium
West Alexander Creek
300
250
200
150
100
50
0
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1

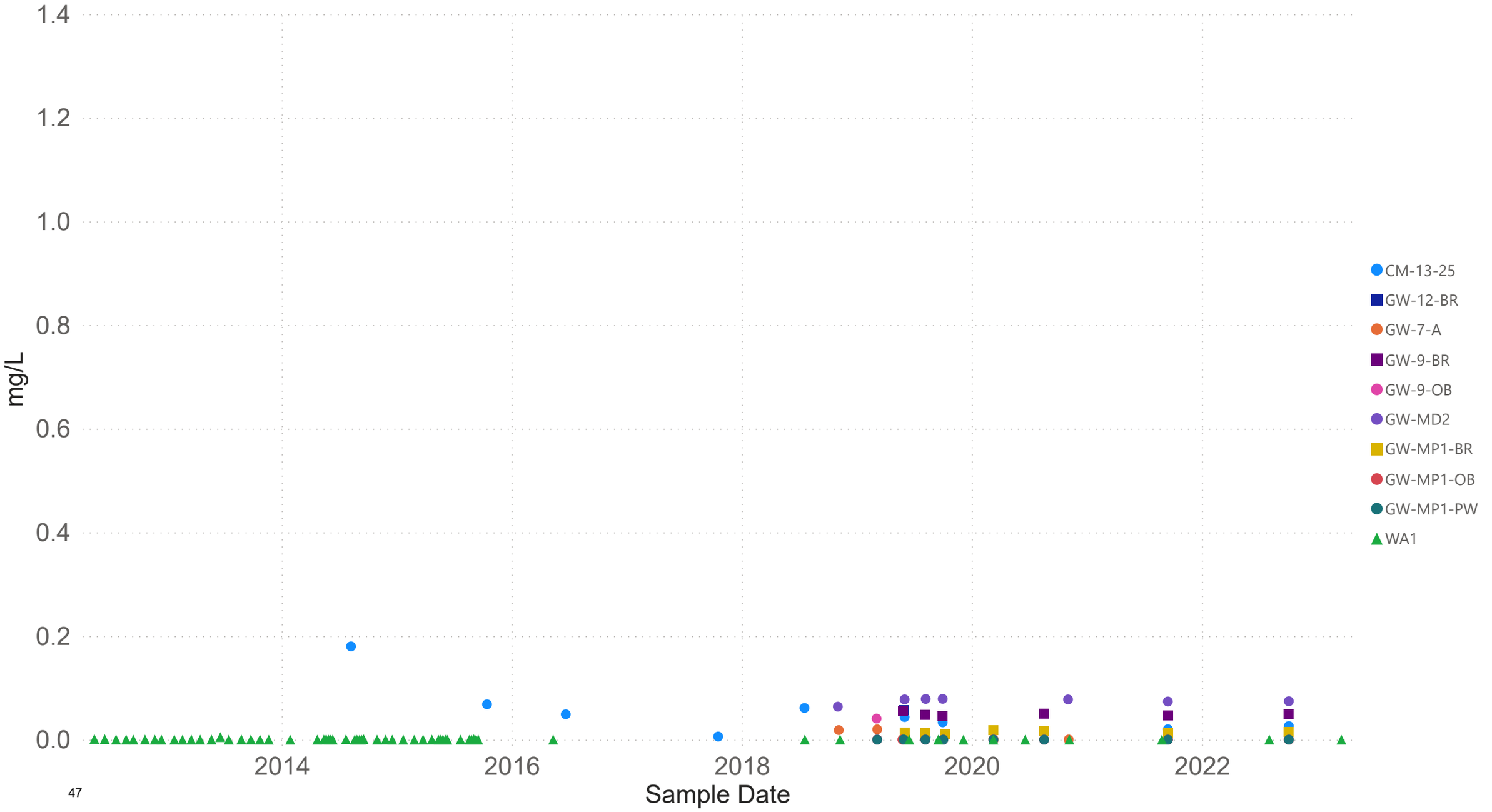

Dissolved Sodium
East Alexander Creek
300
250
200
150
100
50
0
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

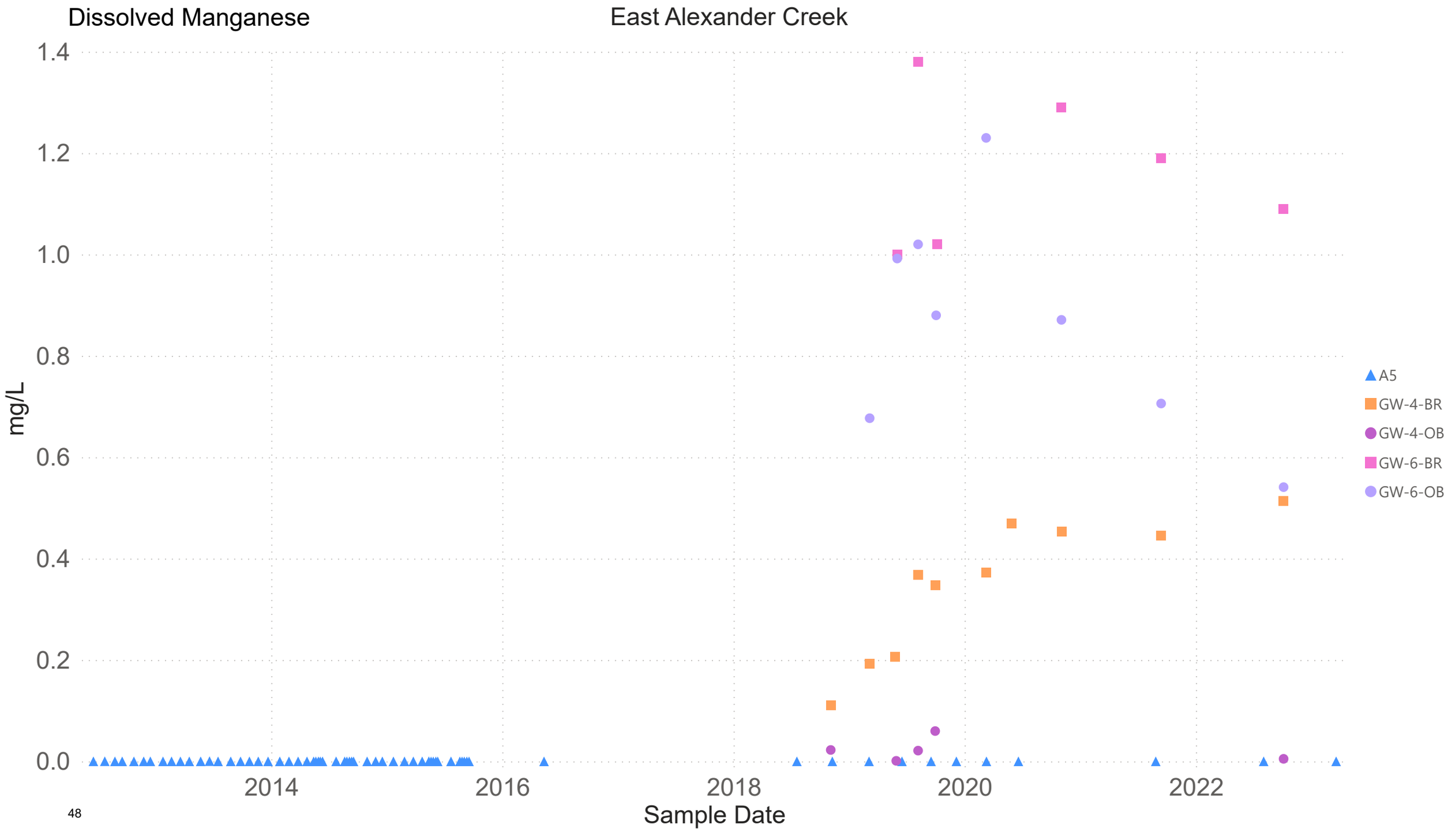

Dissolved Sodium
Alexander Creek
300
250
200
150
100
50
0
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C

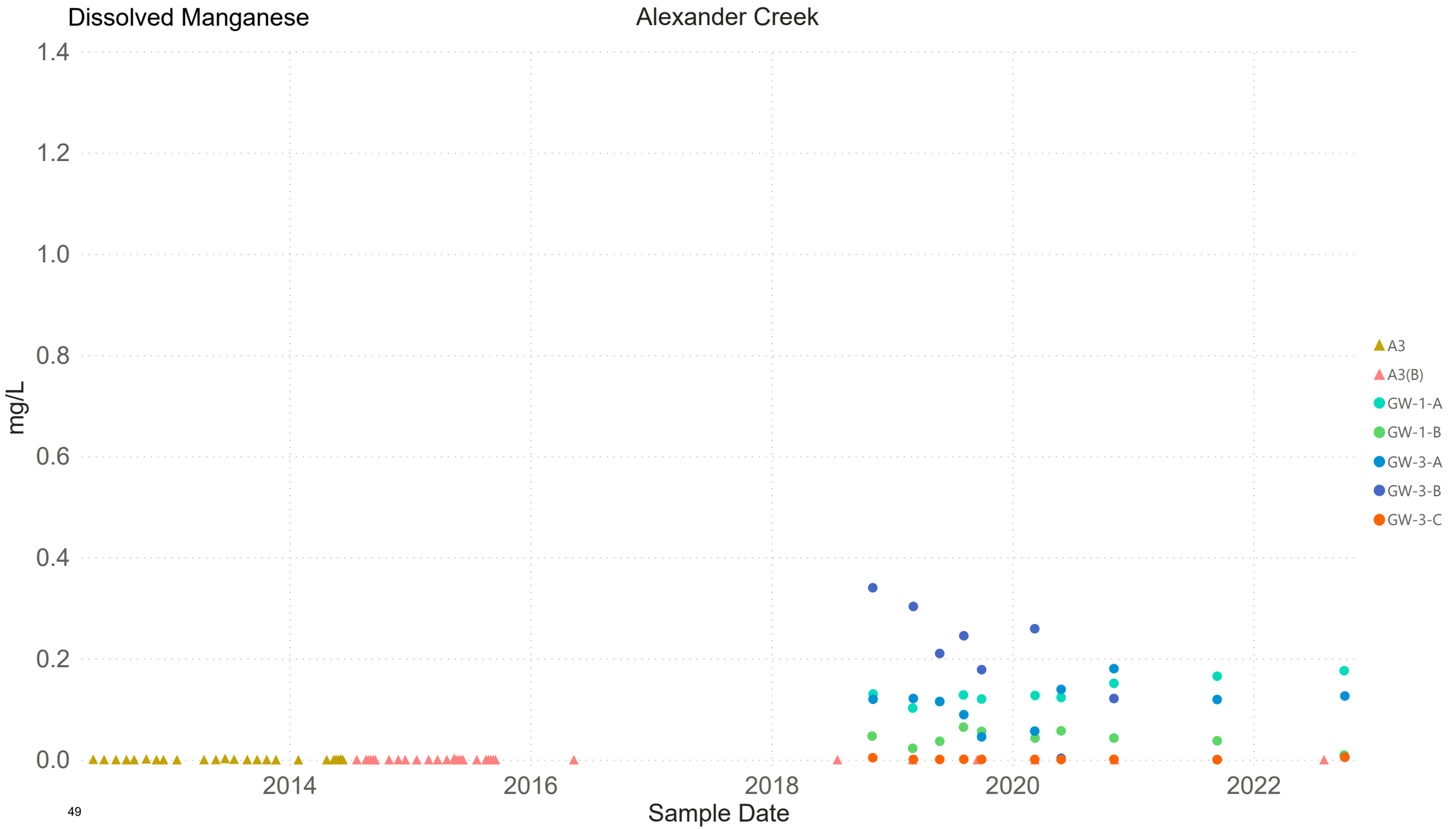

Dissolved Sodium
Grave Creek
300
250
200
150
100
50
0
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2

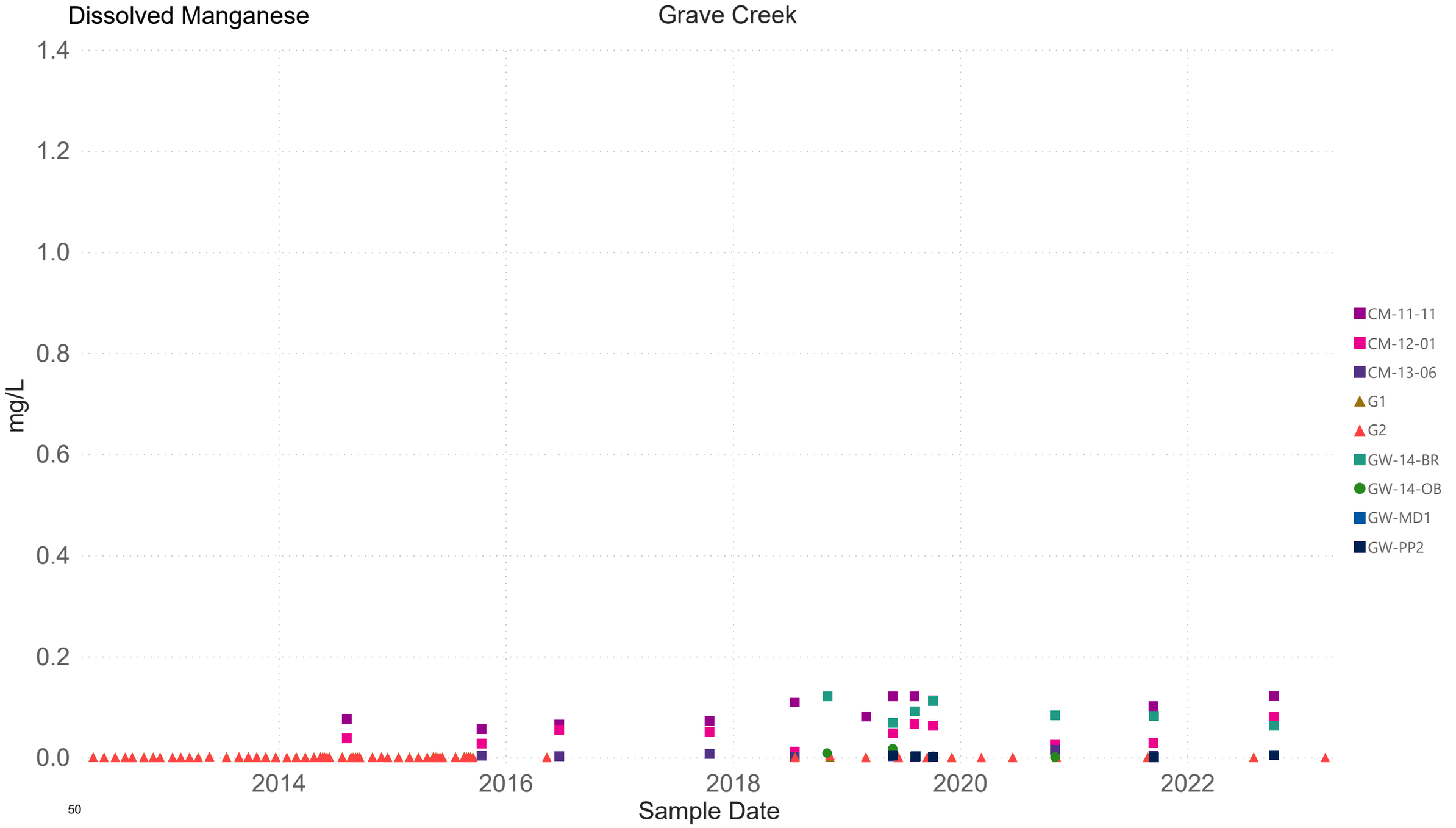
Dissolved Manganese

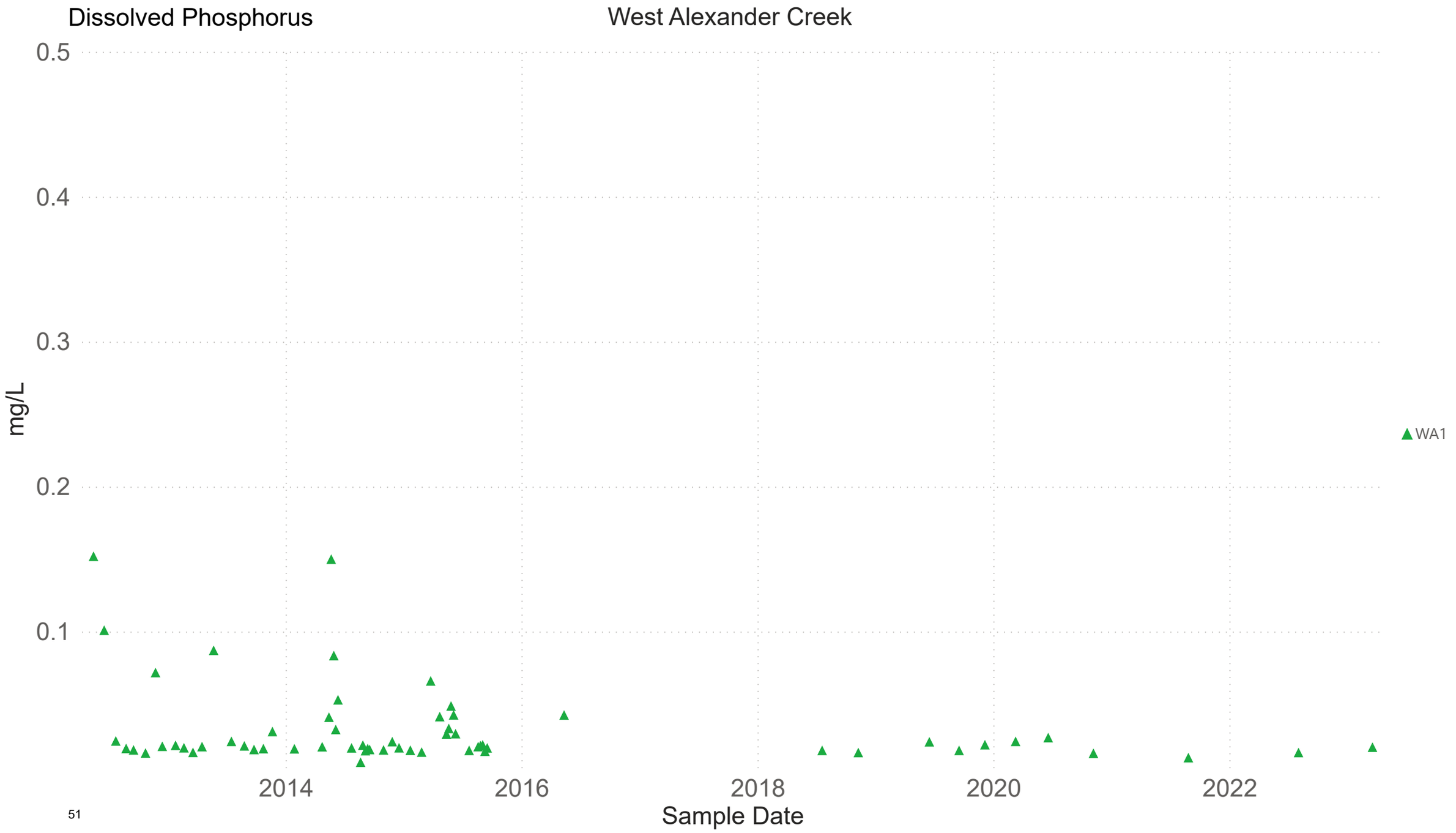
West Alexander Creek

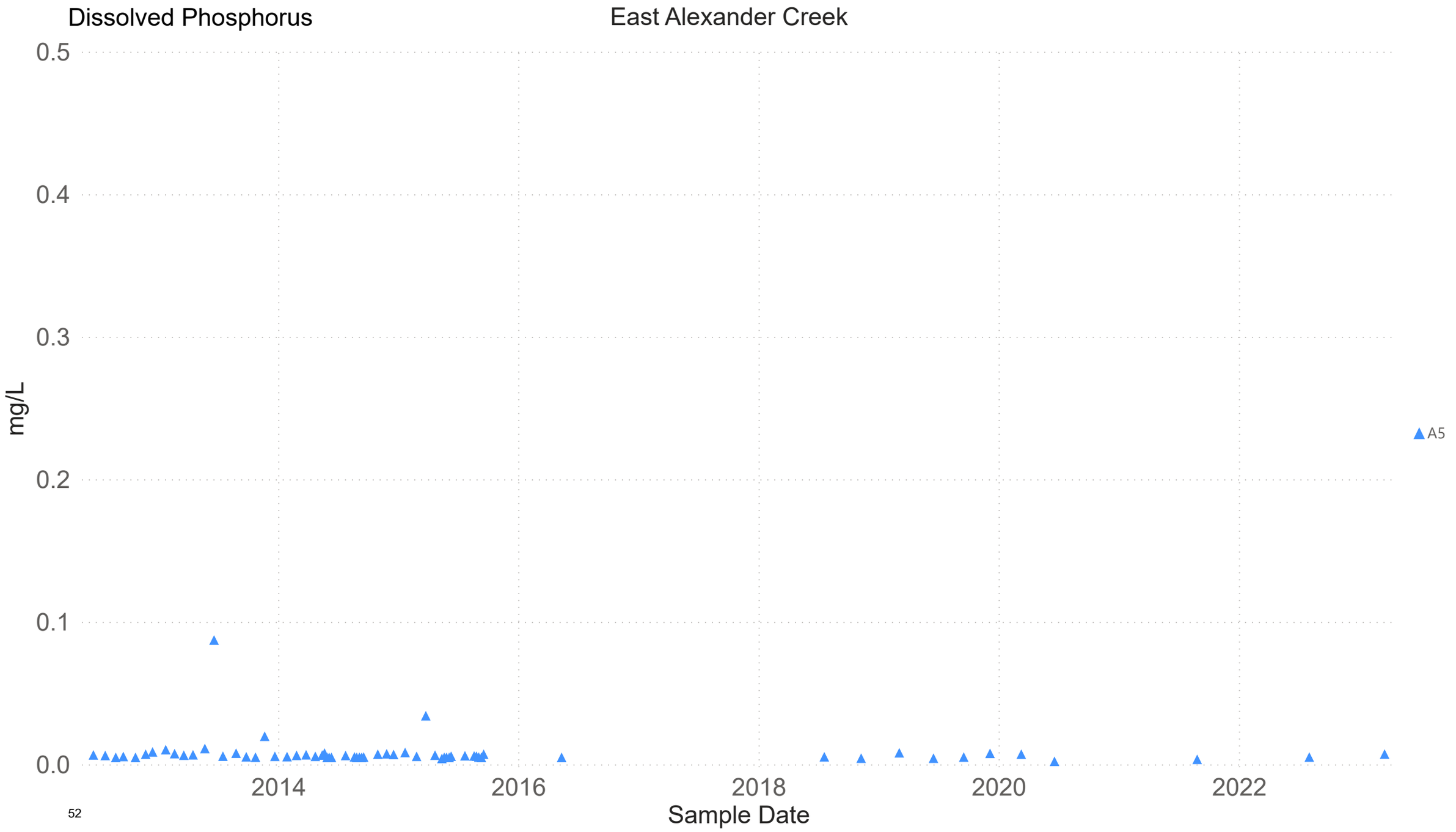


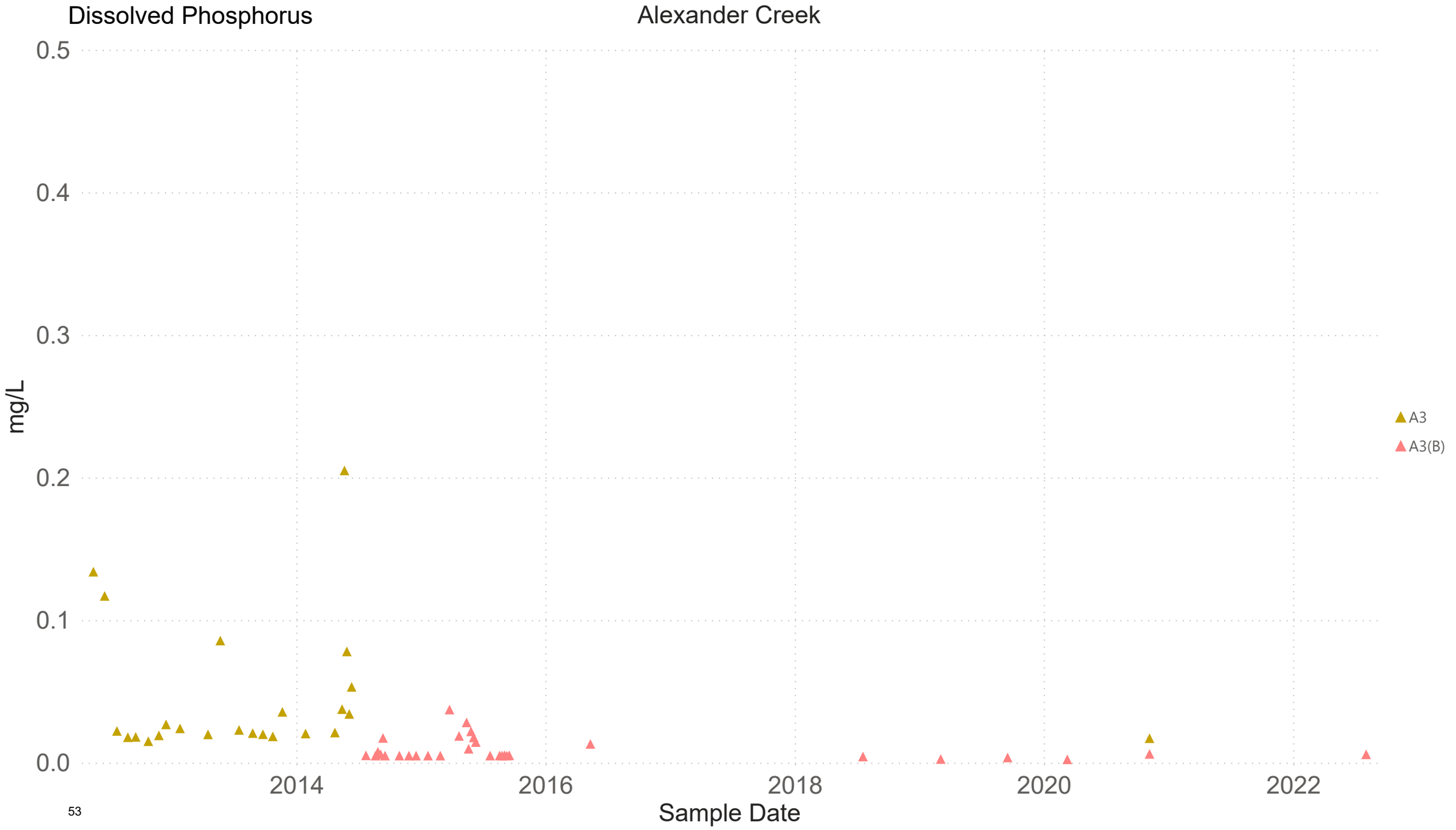

Dissolved Manganese
East Alexander Creek
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
A5
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB

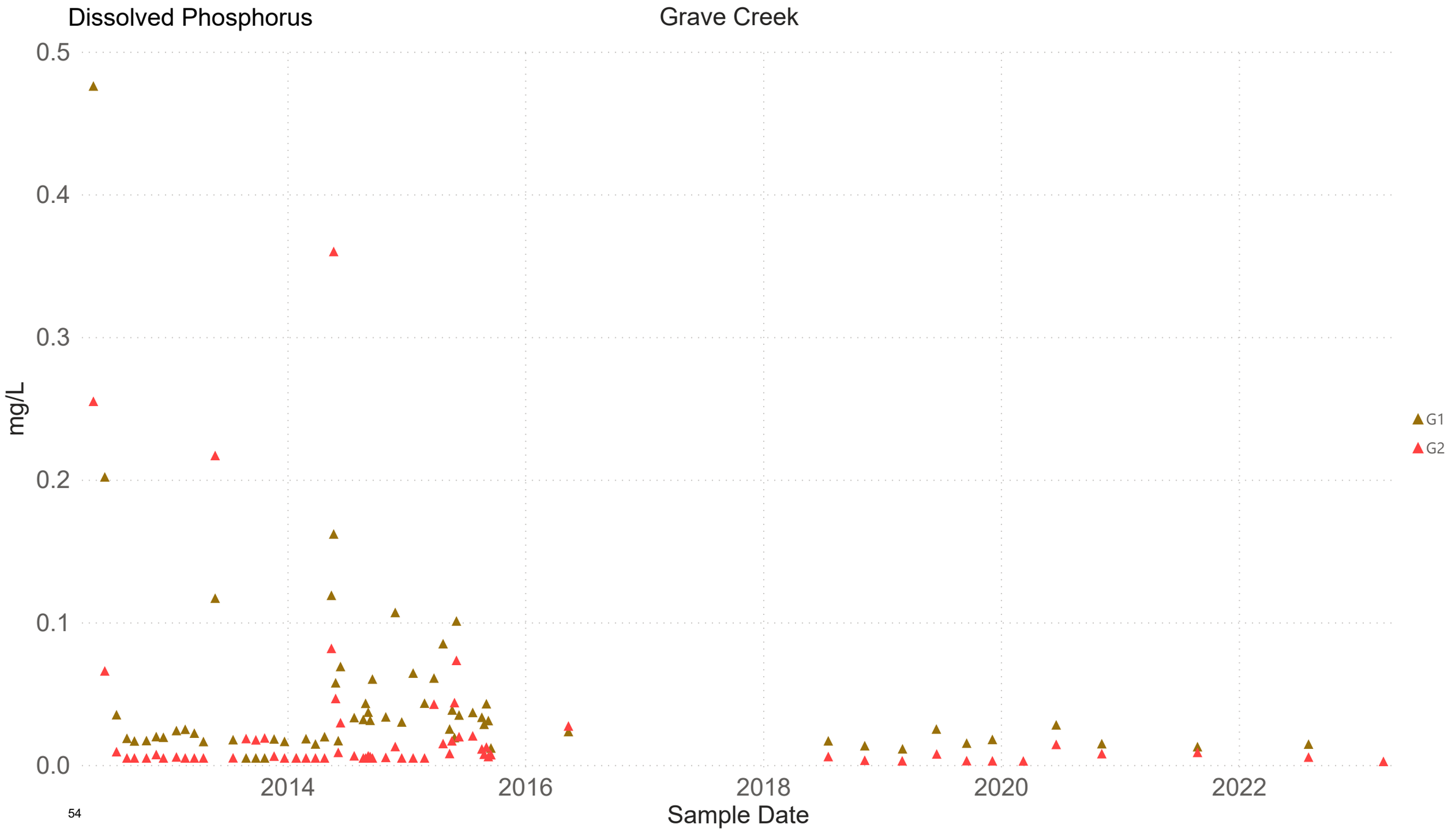

Dissolved Manganese
Alexander Creek
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C


Dissolved Manganese
Grave Creek
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2


Dissolved Phosphorus
West Alexander Creek
0.5
0.4
0.3
0.2
0.1
mg/L
WA1
2014
2016
2018
2020
2022
Sample Date


Dissolved Phosphorus
East Alexander Creek
0.5
0.4
0.3
0.2
0.1
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
A5

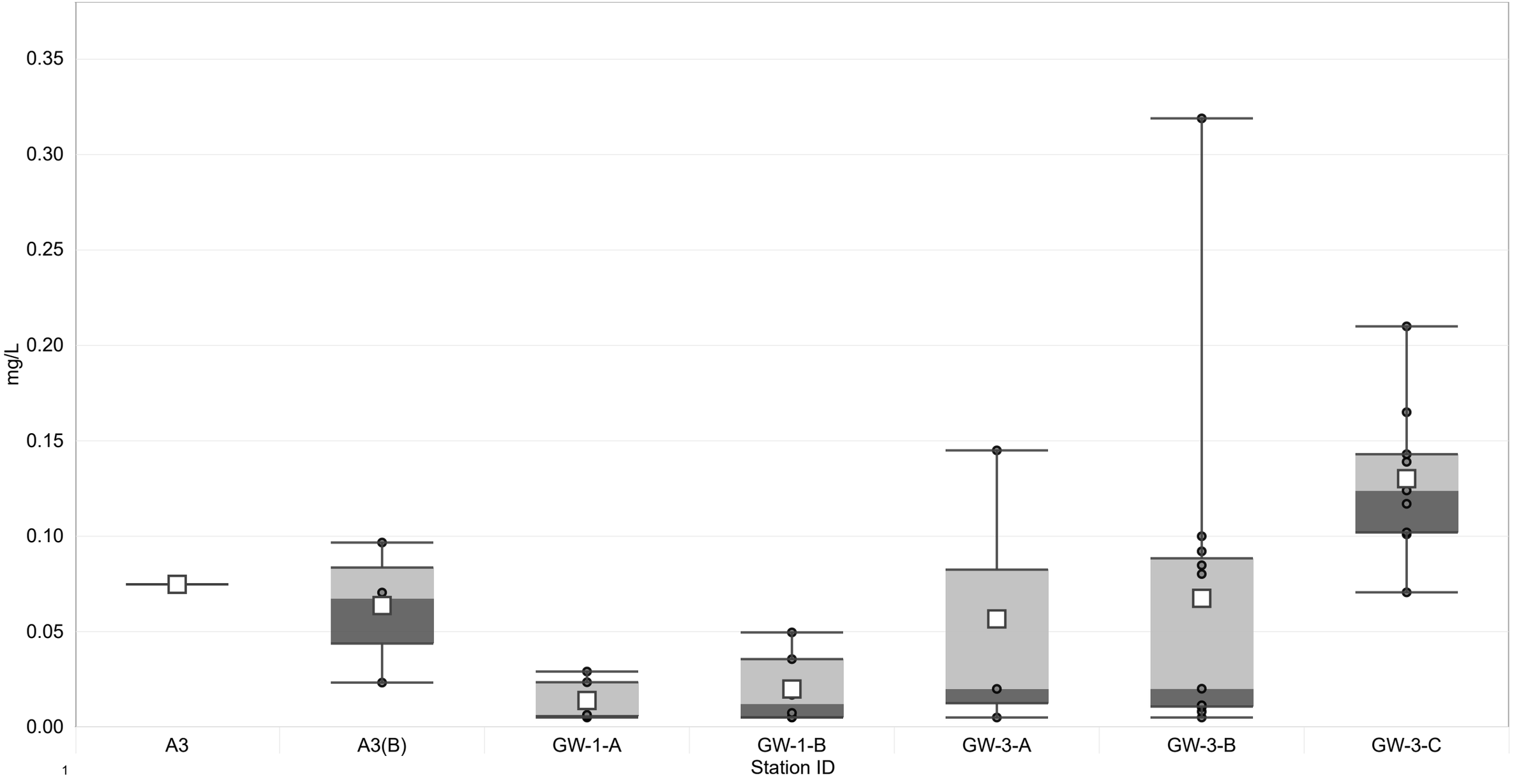

Dissolved Phosphorus
Alexander Creek
0.5
0.4
0.3
0.2
0.1
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
A3
A3(B)


Dissolved Phosphorus
Grave Creek
0.5
0.4
0.3
0.2
0.1
0.0
mg/L
2014
2016
2018
2020
2022
Sample Date
G1
G2

Attachment 4 Water Quality – Box and Whisker Plots

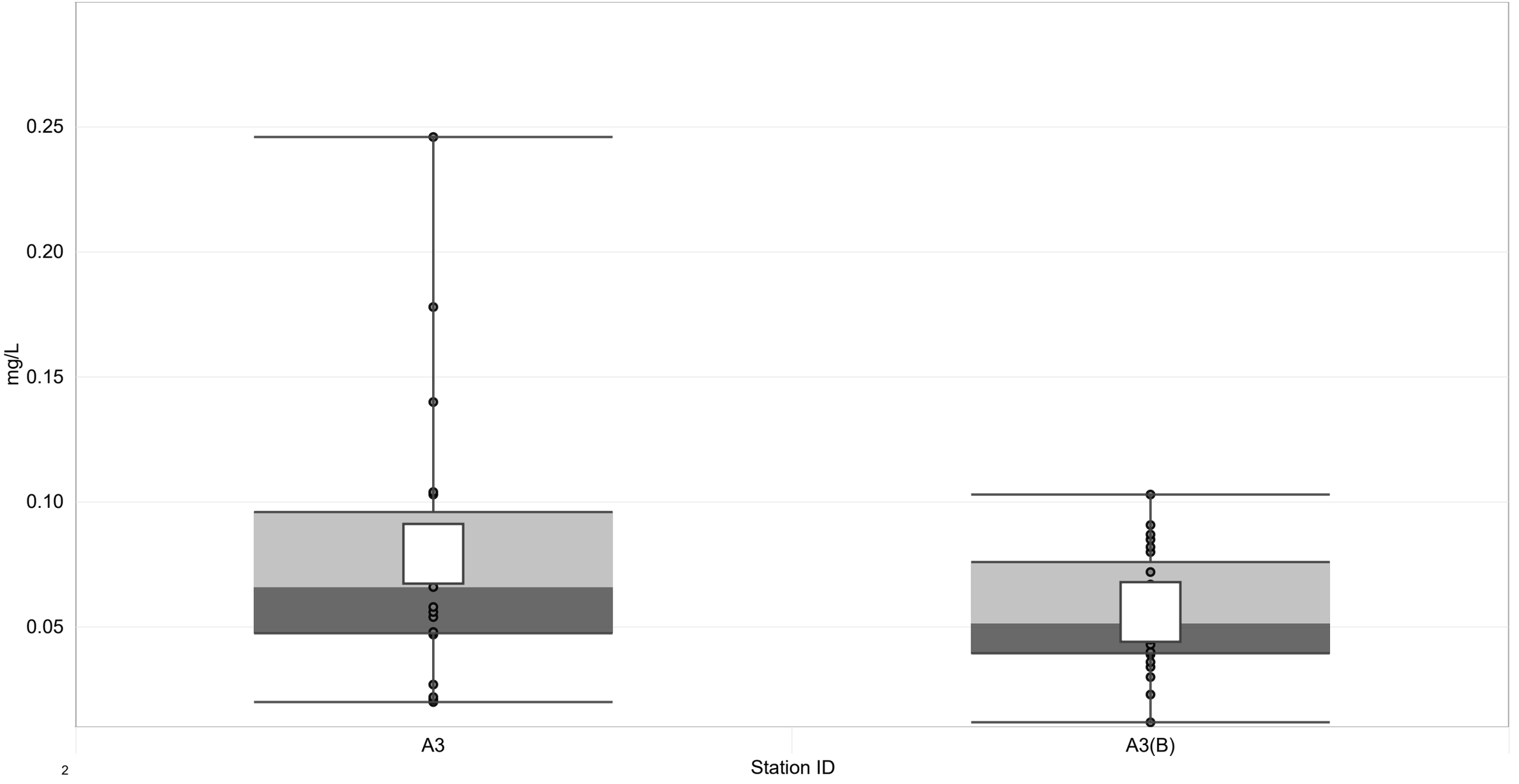
Alexander Creek

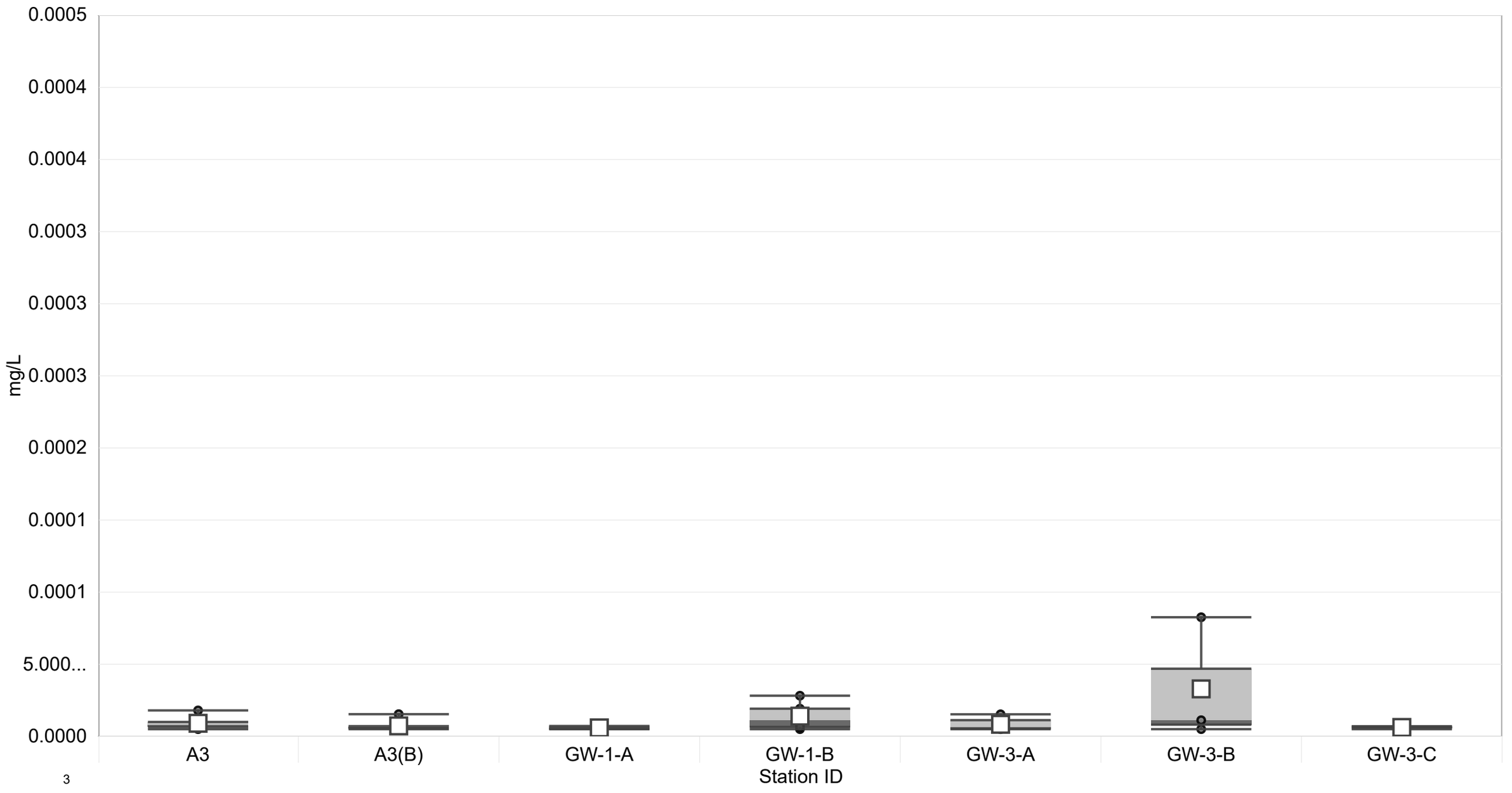
Nitrate (as N)

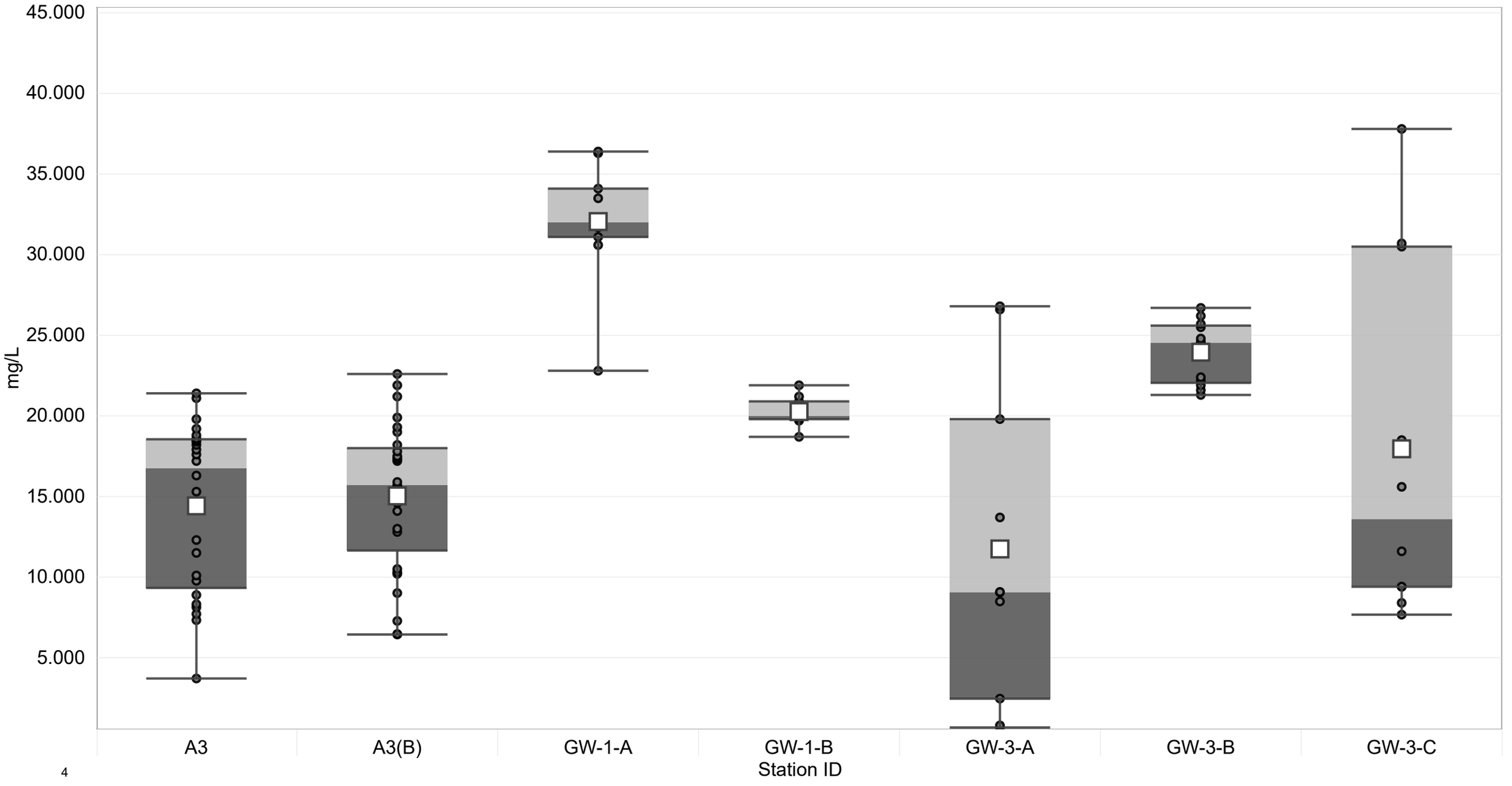


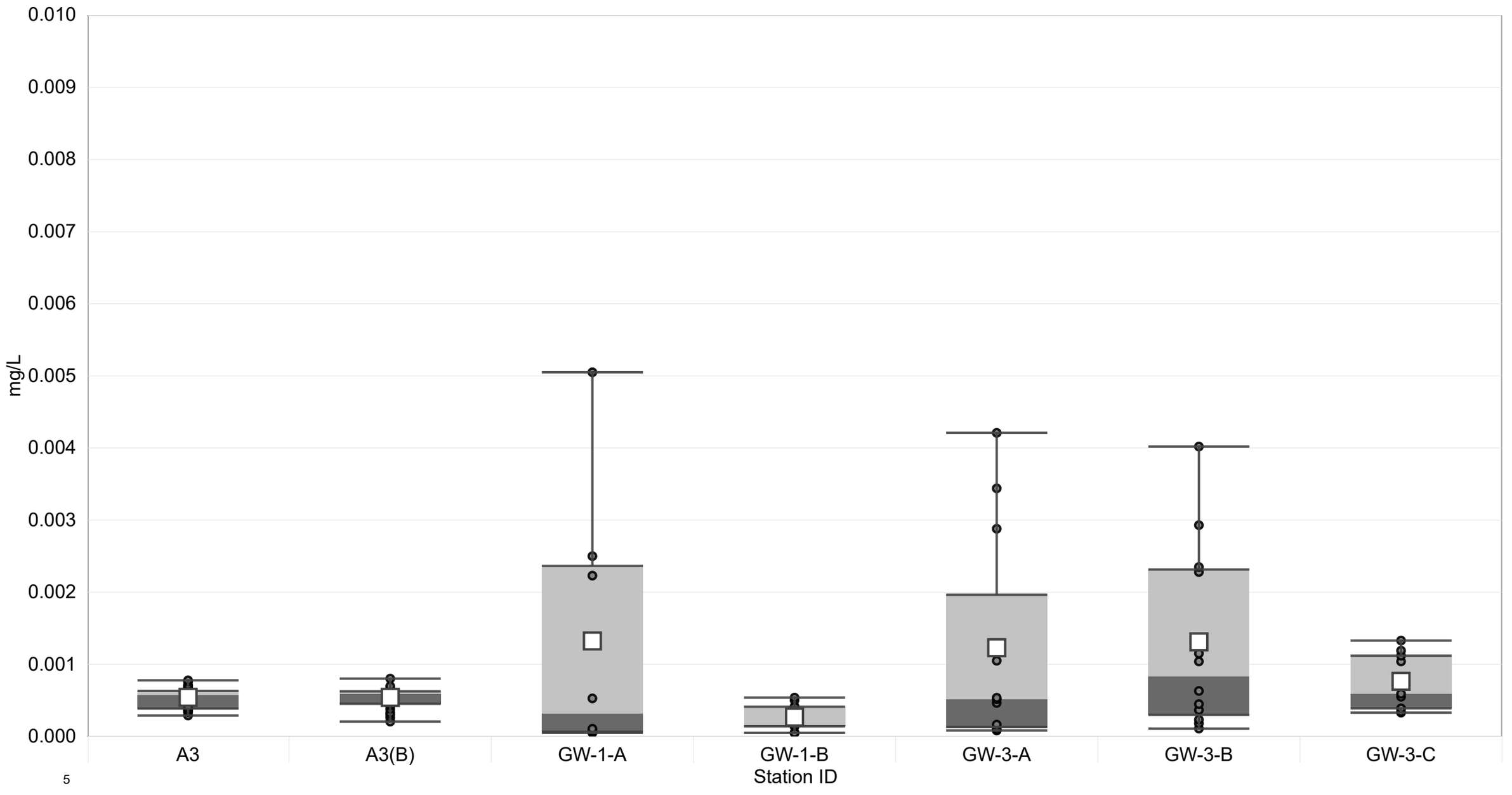
Alexander Creek

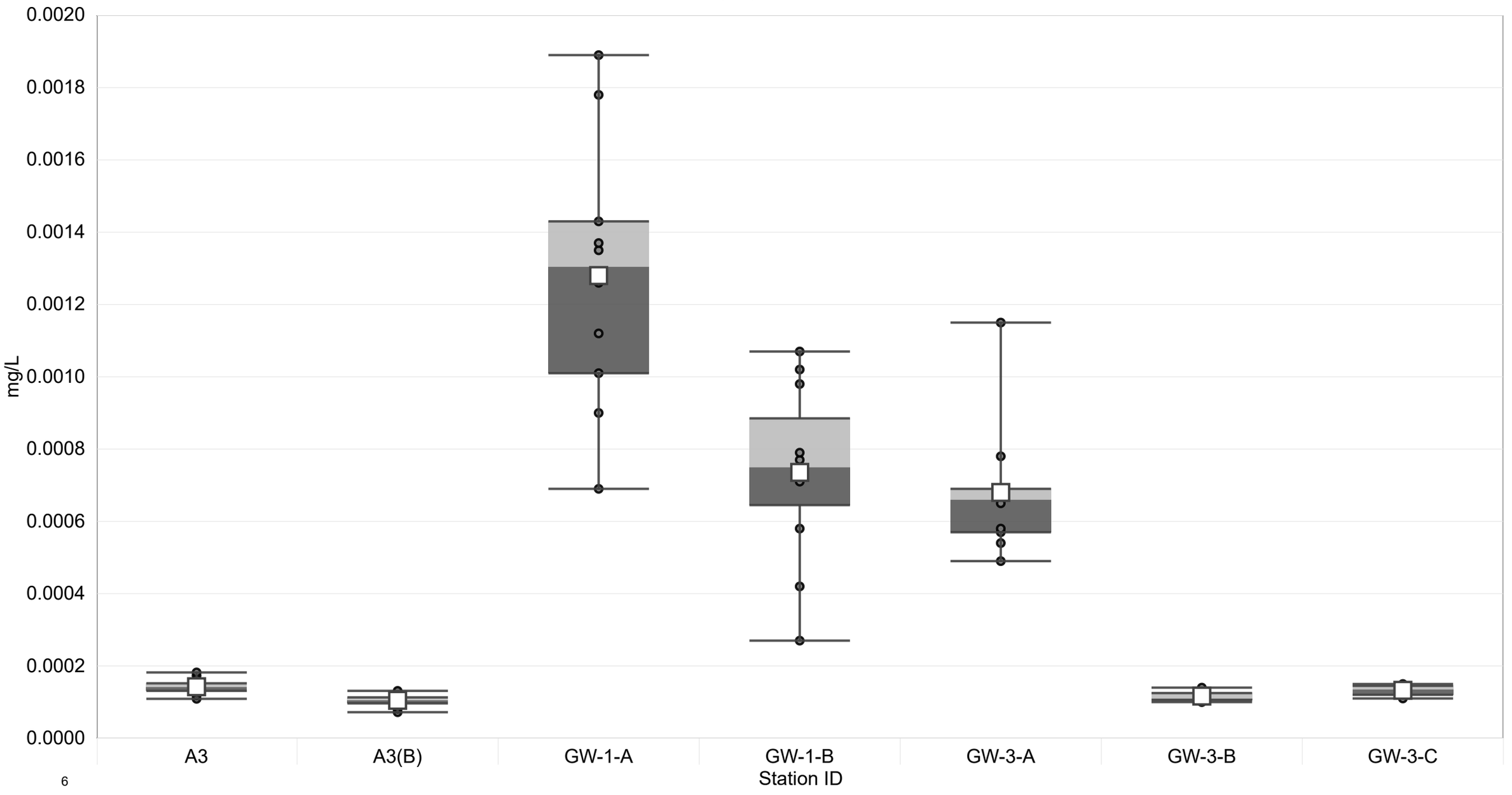
Nitrate (as NO3-)

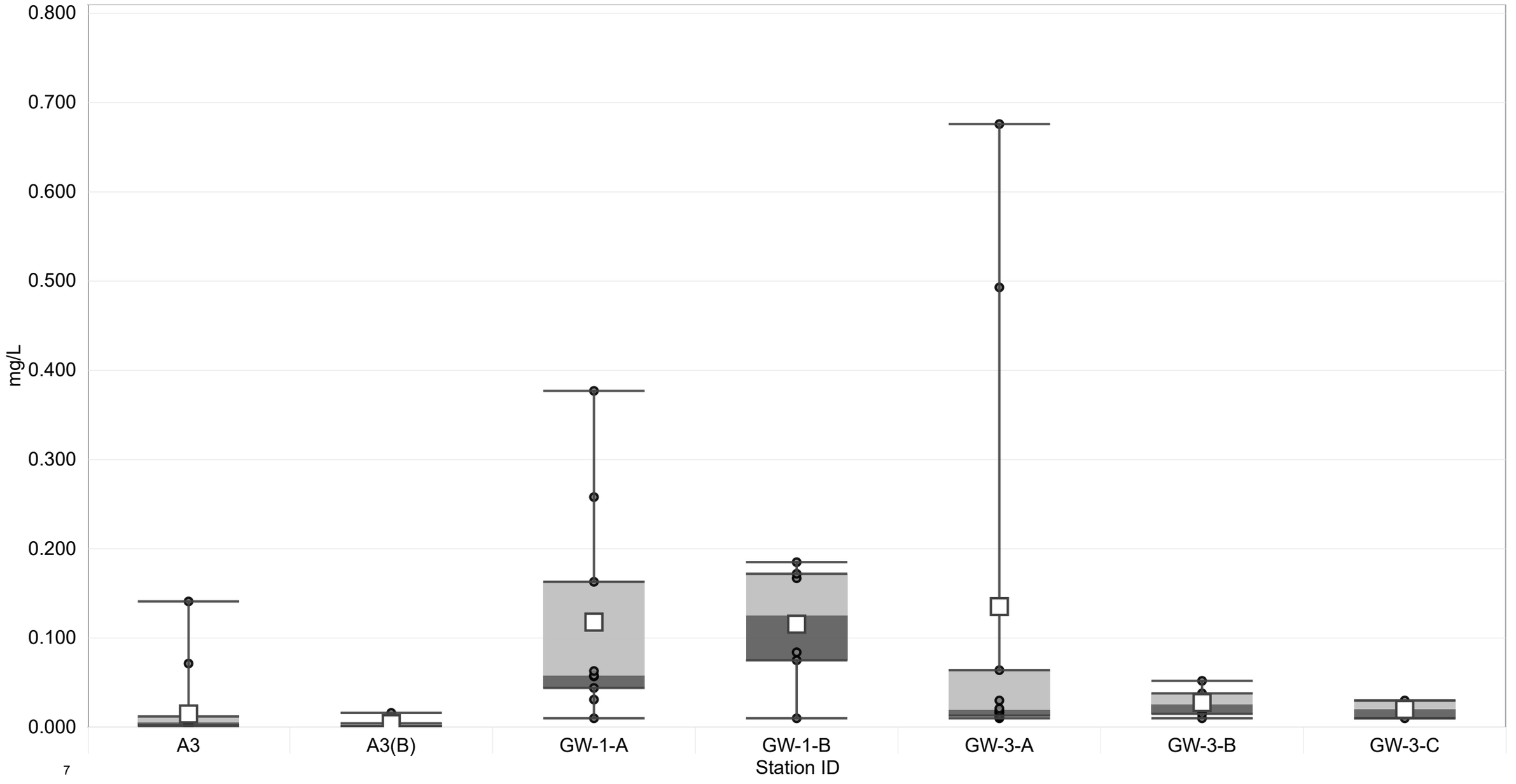


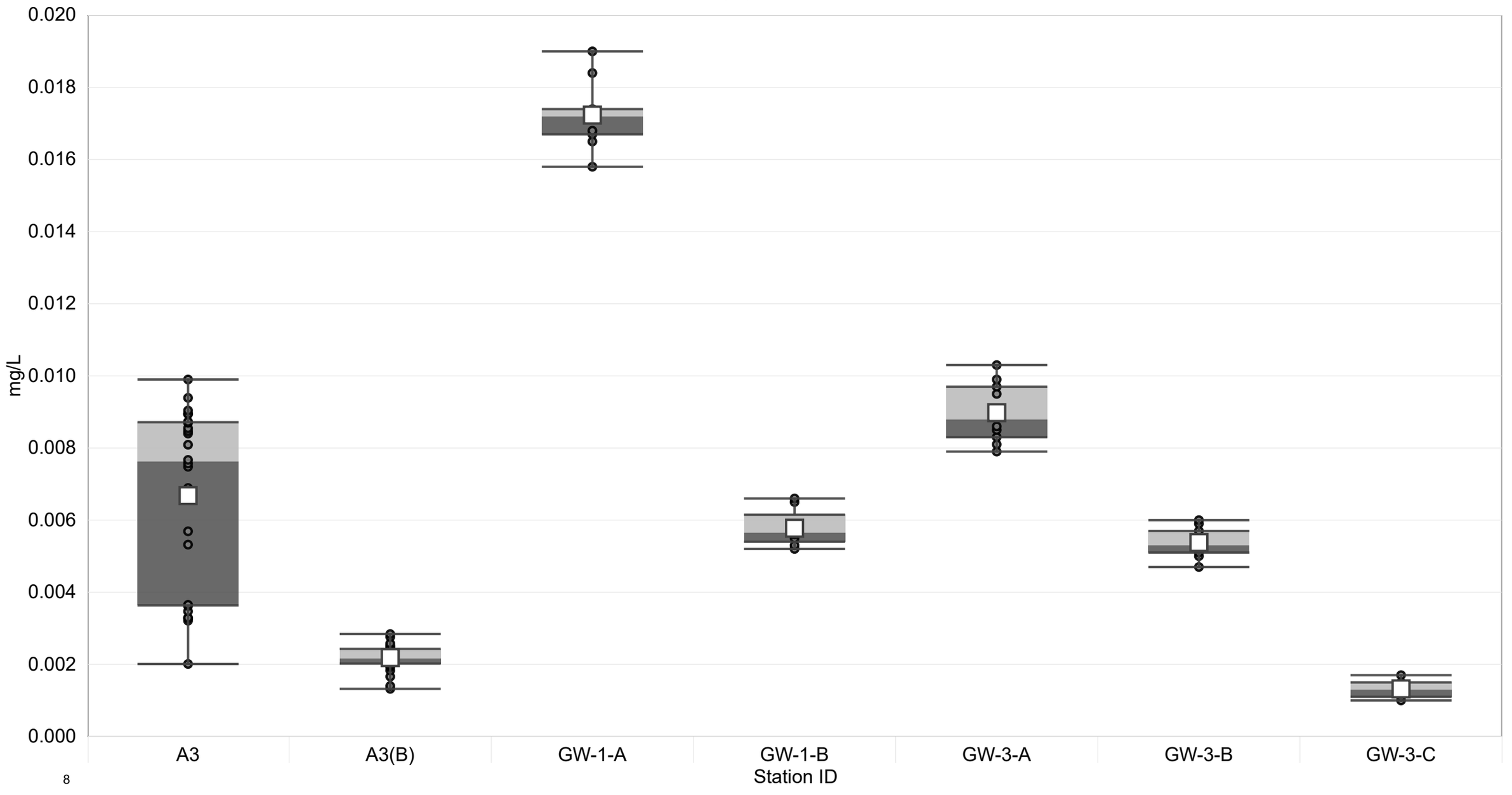

Alexander Creek
Cadmium (Cd)-Dissolved
0.0005
0.0004
0.0004
0.0003
0.0003
mg/L
0.0003
0.0002
0.0001
0.0001
5.000...
0.0000
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C
Station ID

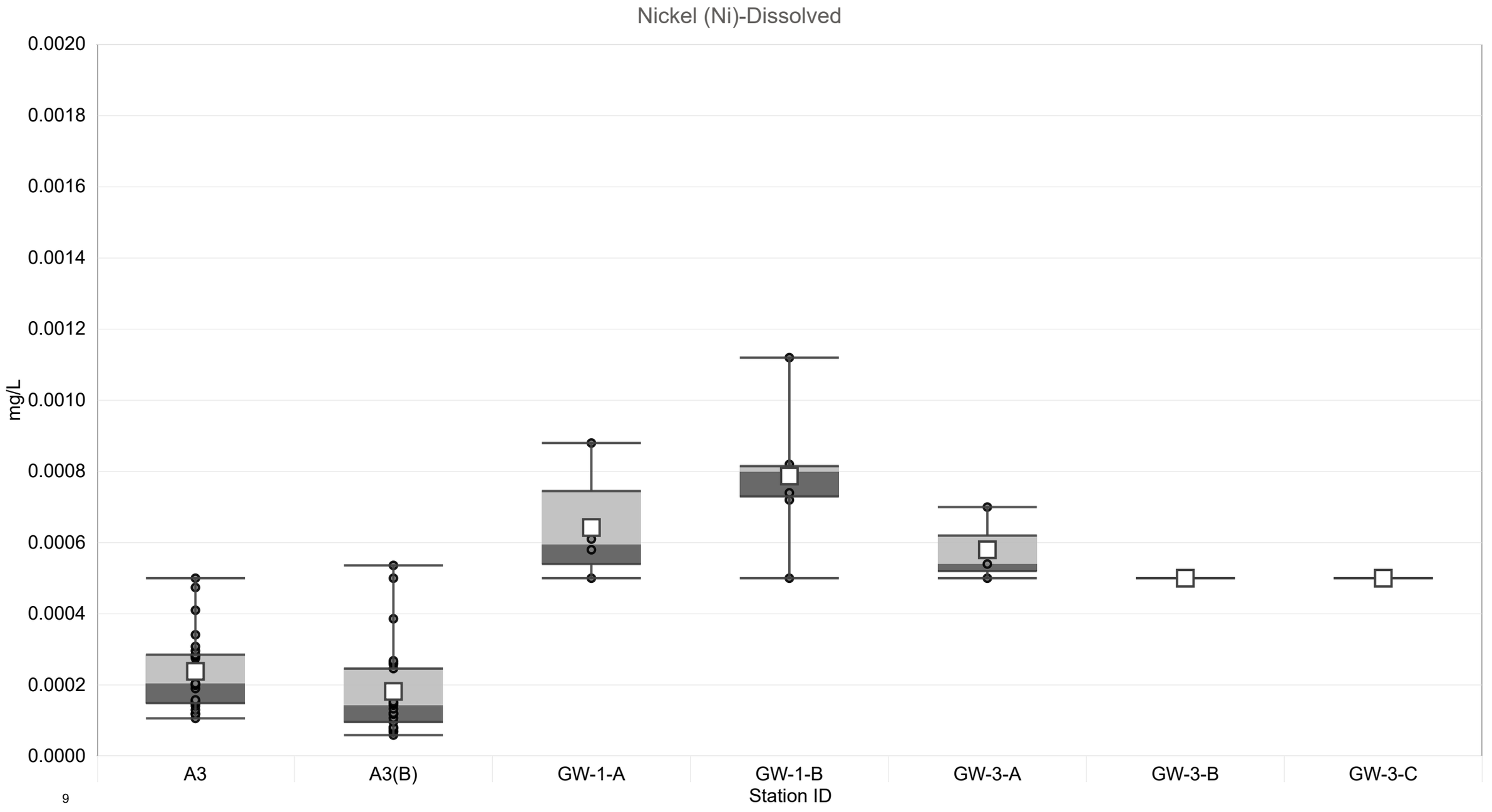

Alexander Creek
Sulphate (SO4)
45.000
40.000
35.000
30.000
25.000
20.000
15.000
10.000
5.000
mg/L
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C
Station ID

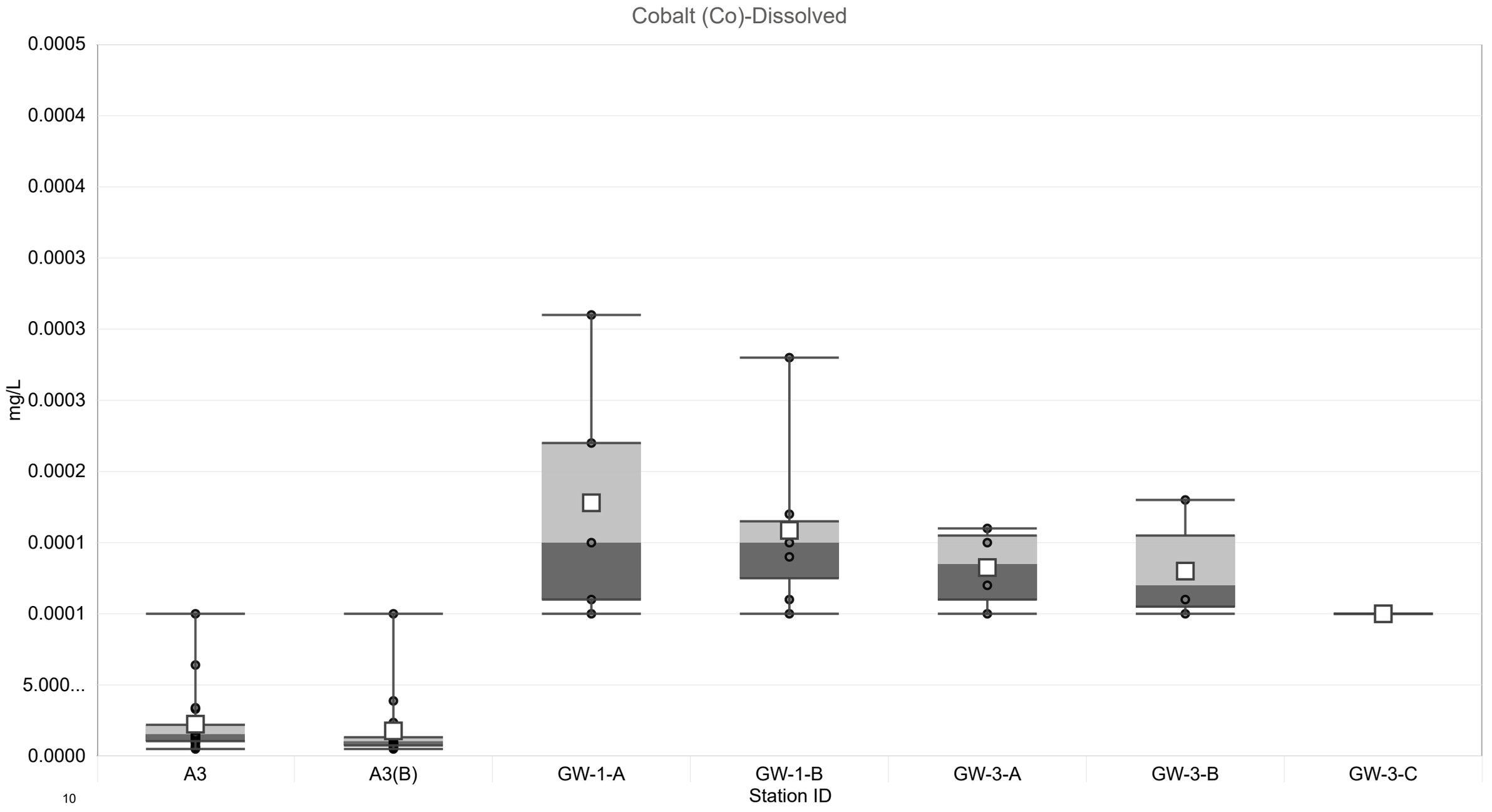

Alexander Creek
Selenium (Se)-Dissolved
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
mg/L
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C
Station ID


Alexander Creek
Arsenic (As)-Dissolved
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
mg/L
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C
Station ID


Alexander Creek
Iron (Fe)-Dissolved
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
mg/L
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C
Station ID

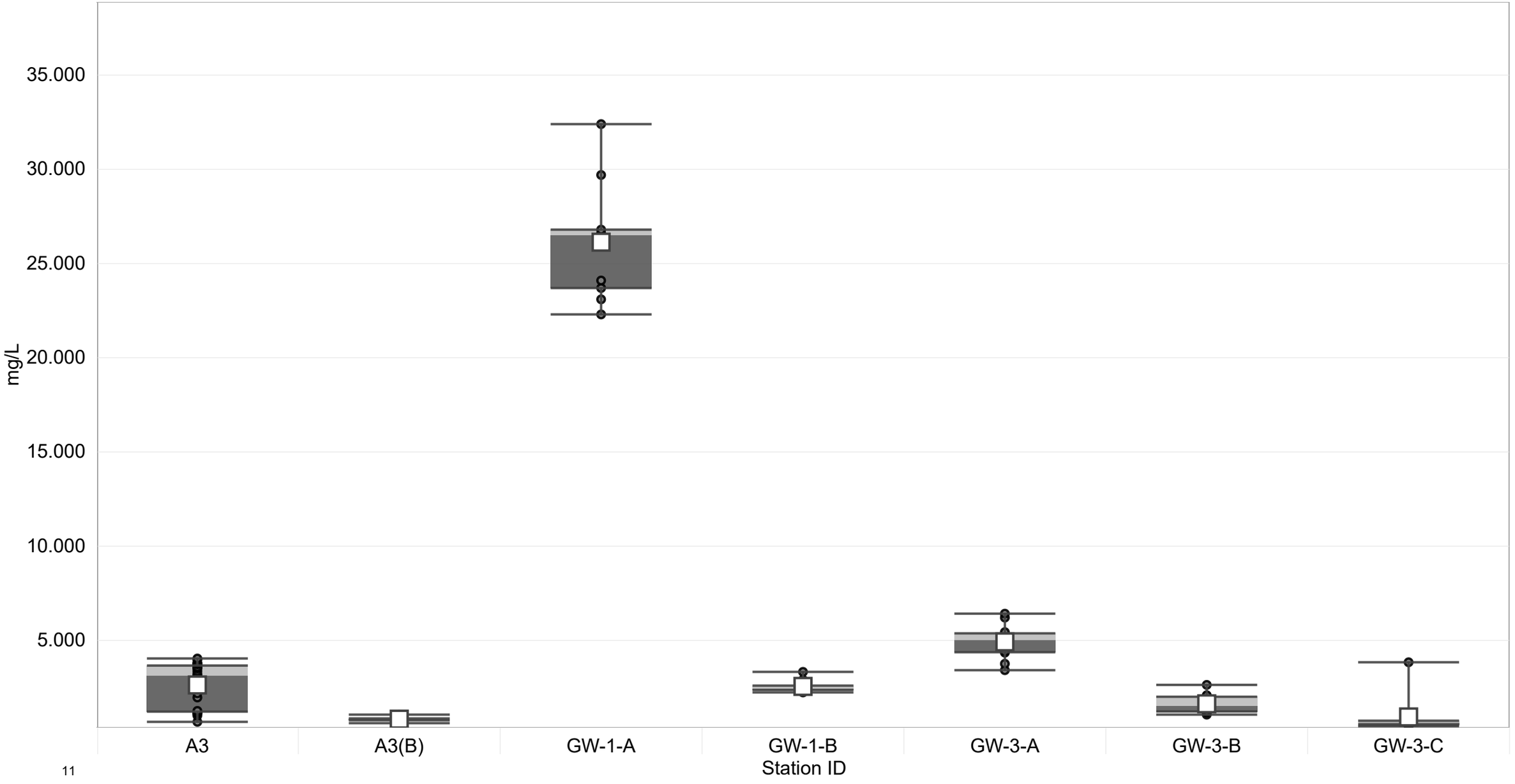

Alexander Creek
Lithium (Li)-Dissolved
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
mg/L
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C
Station ID


Alexander Creek
Nickel (Ni)-Dissolved
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
mg/L
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C
Station ID


Alexander Creek
Cobalt (Co)-Dissolved
0.0005
0.0004
0.0004
0.0003
0.0003
0.0003
0.0002
0.0001
0.0001
5.000...
0.0000
mg/L
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C
Station ID

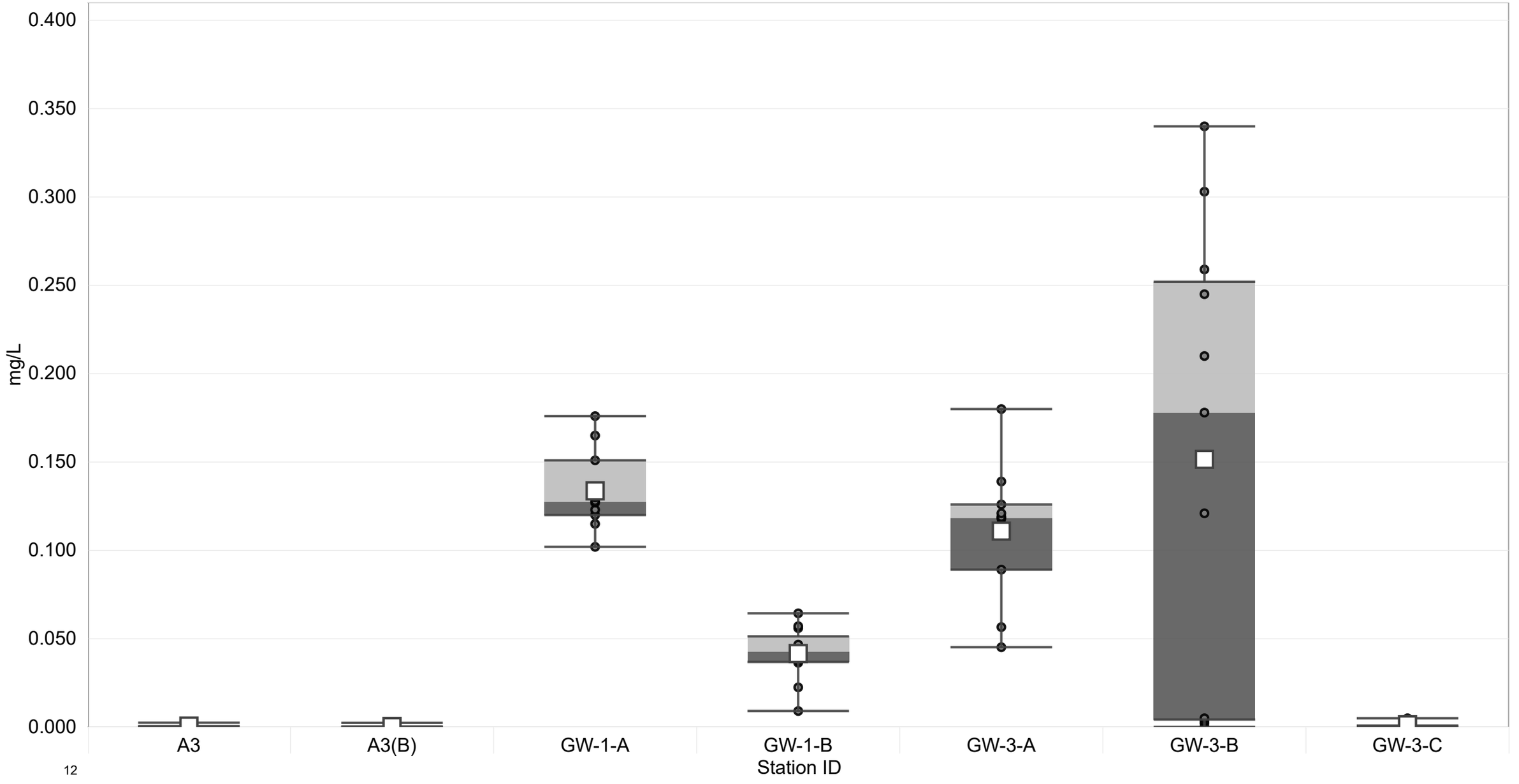
Alexander Creek

Sodium (Na)-Dissolved



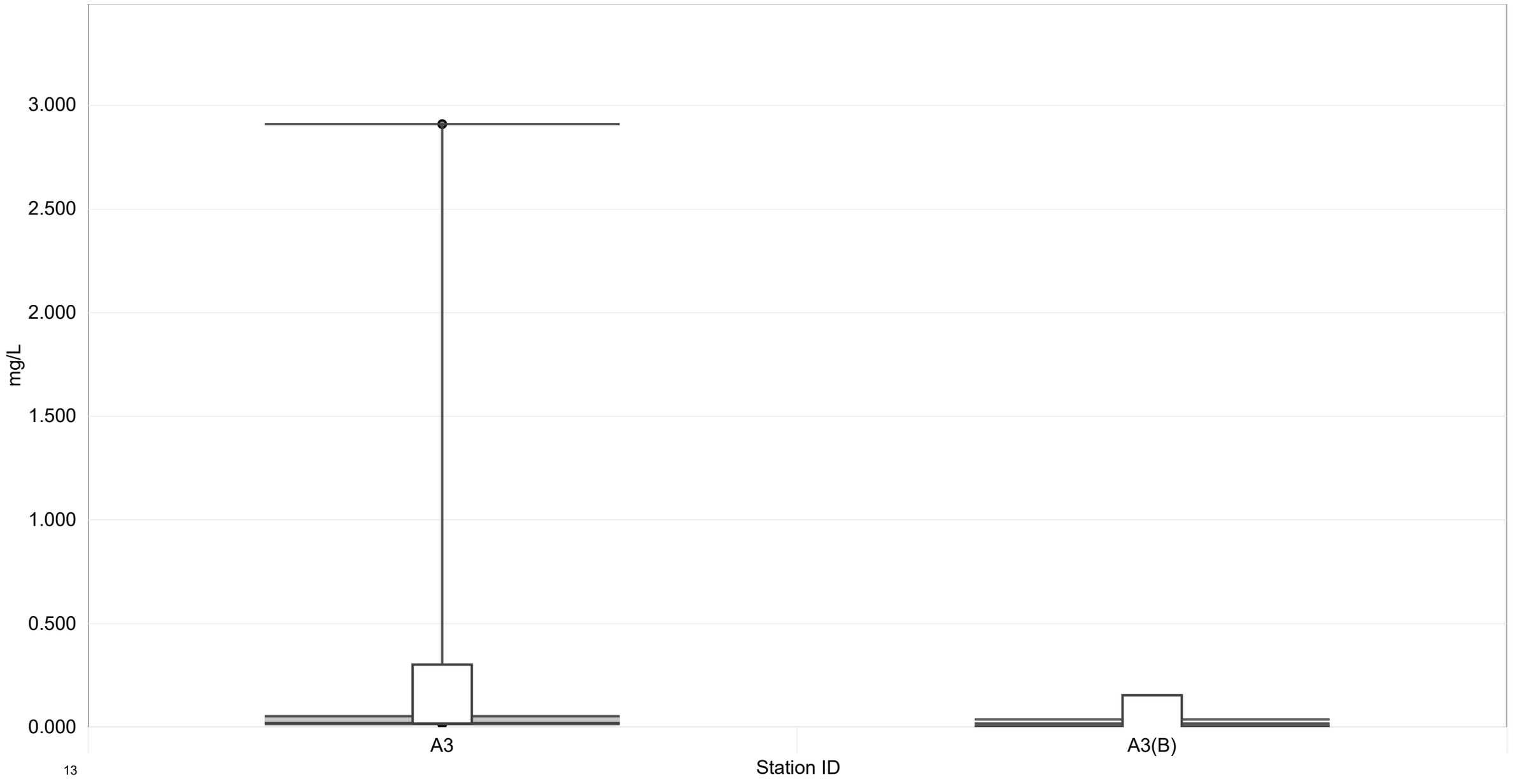
Alexander Creek

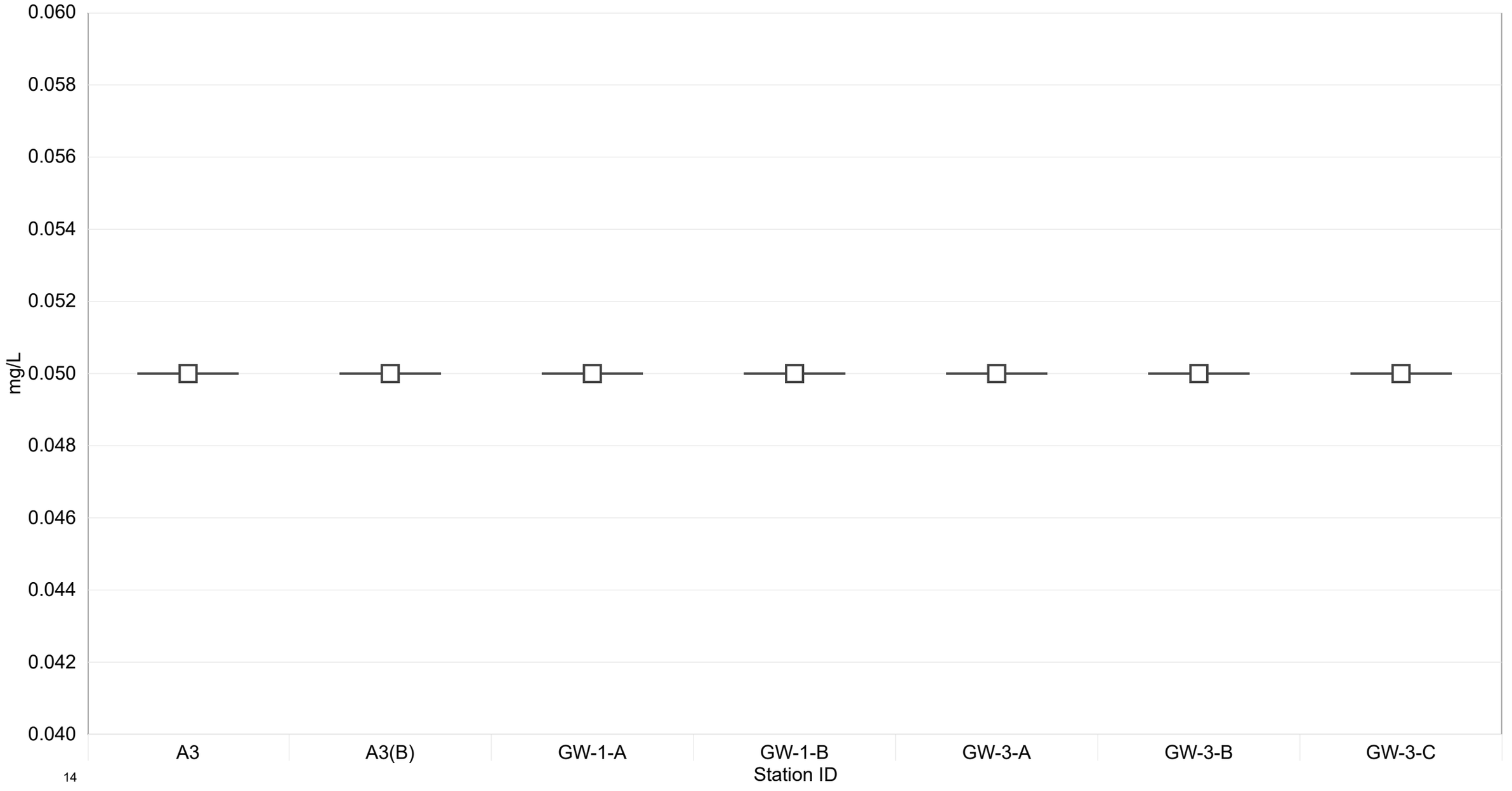
Manganese (Mn)-Dissolved

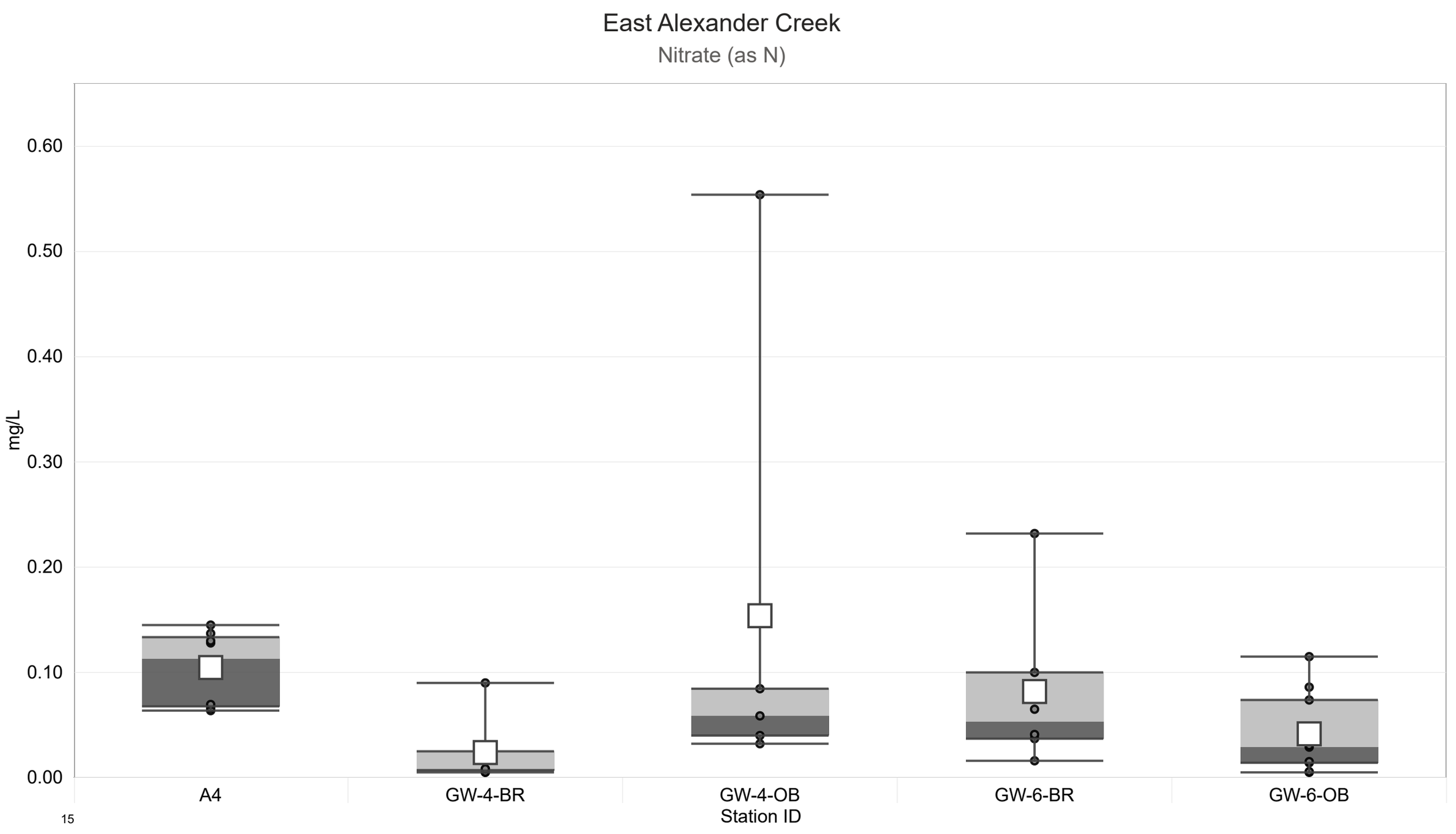


Alexander Creek

Phosphorus

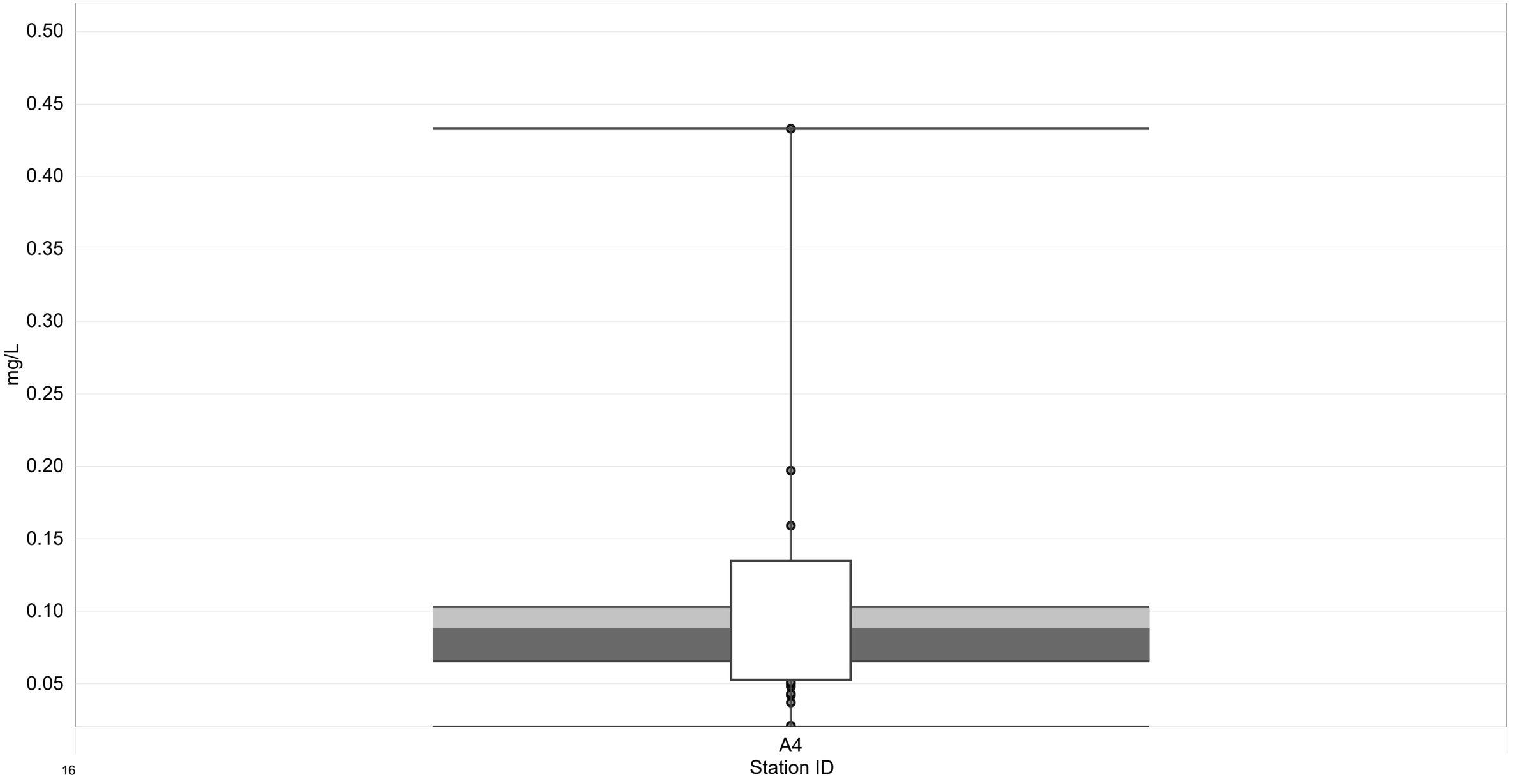


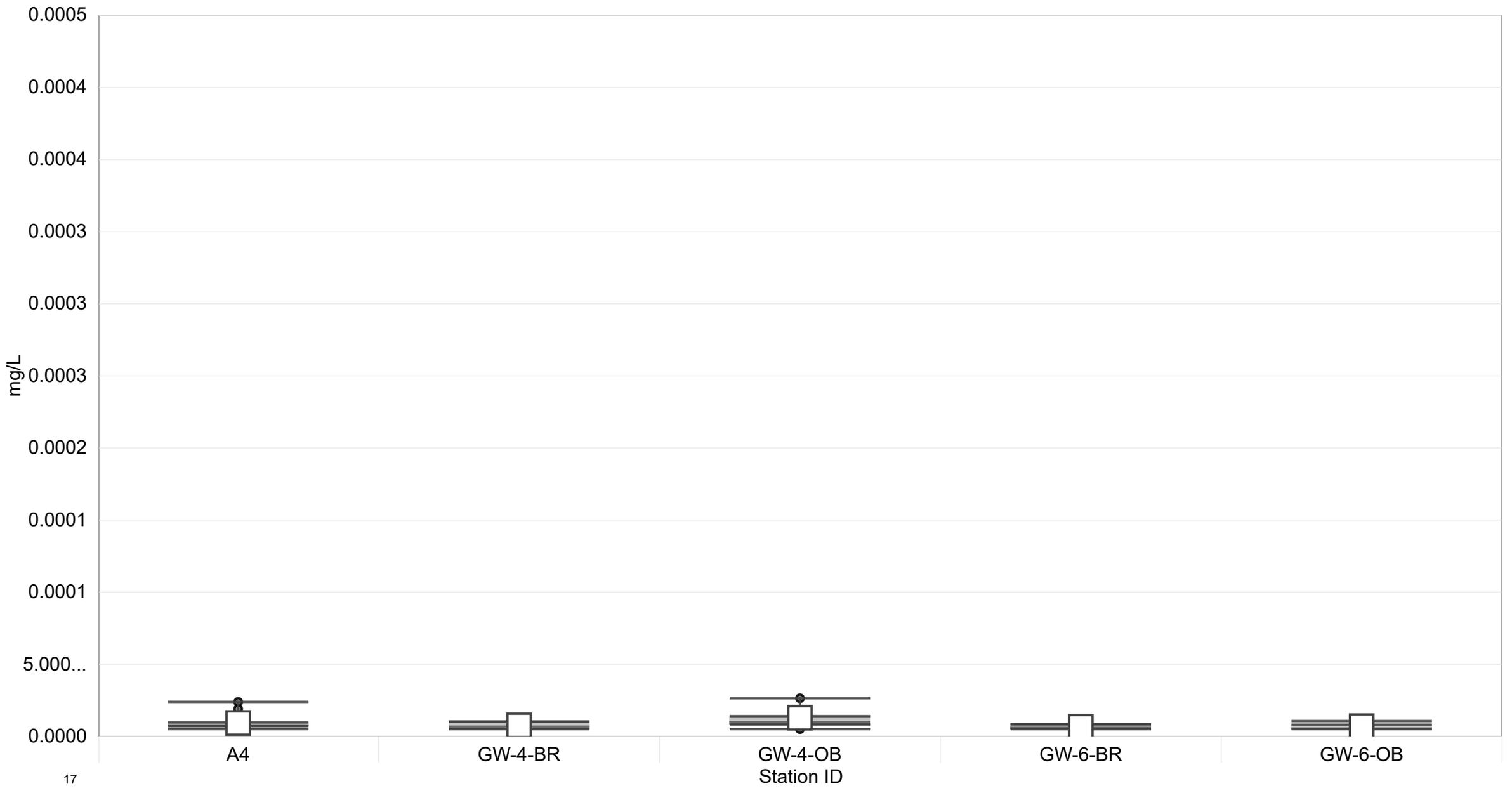

Alexander Creek
Phosphorus (P)-Dissolved
0.060
0.058
0.056
0.054
0.052
0.050
0.048
0.046
0.044
0.042
0.040
mg/L
A3
A3(B)
GW-1-A
GW-1-B
GW-3-A
GW-3-B
GW-3-C
Station ID


East Alexander Creek
Nitrate (as N)
0.60
0.50
0.40
0.30
0.20
0.10
0.00
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID

East Alexander Creek

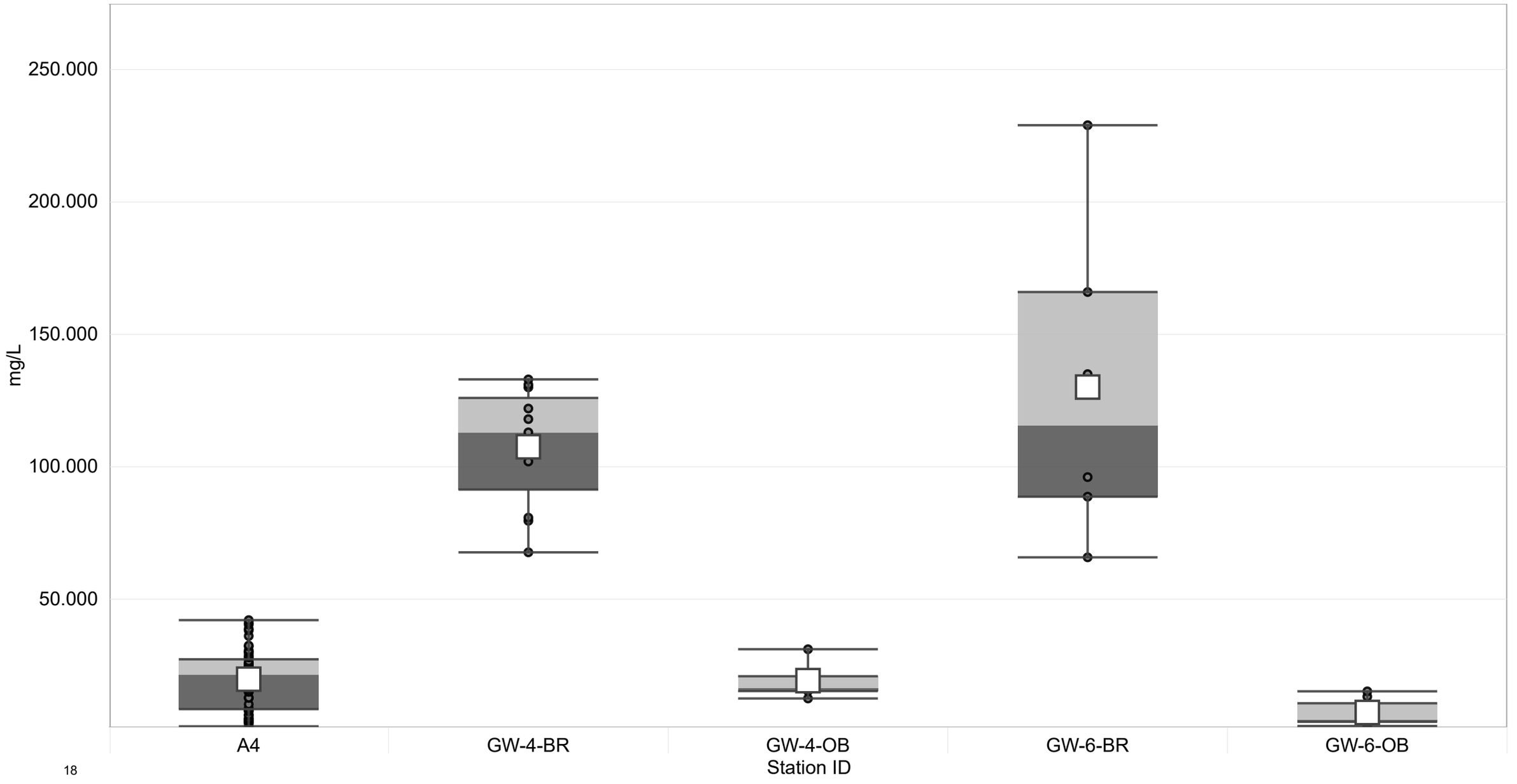
Nitrate (as NO3-)

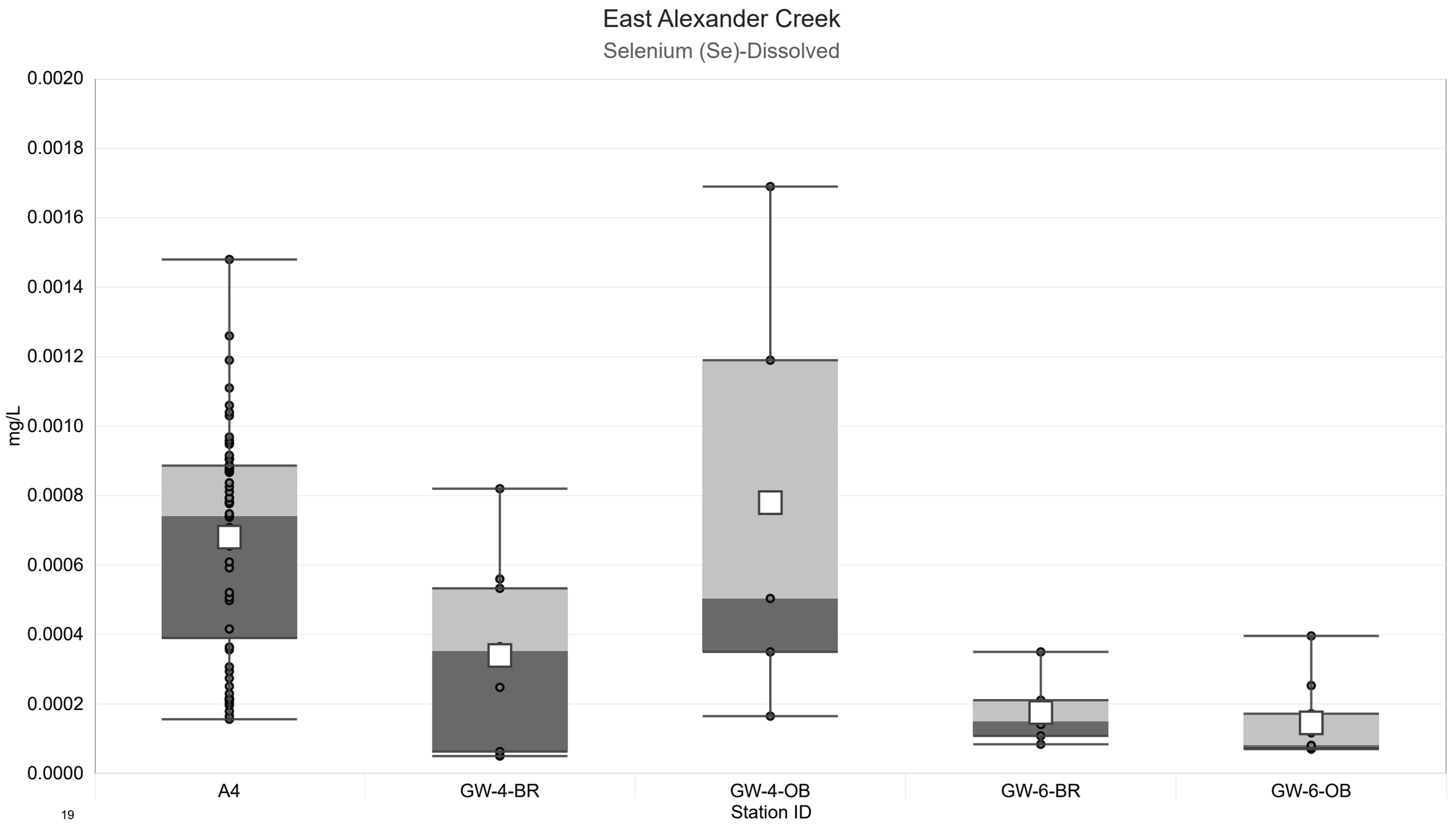


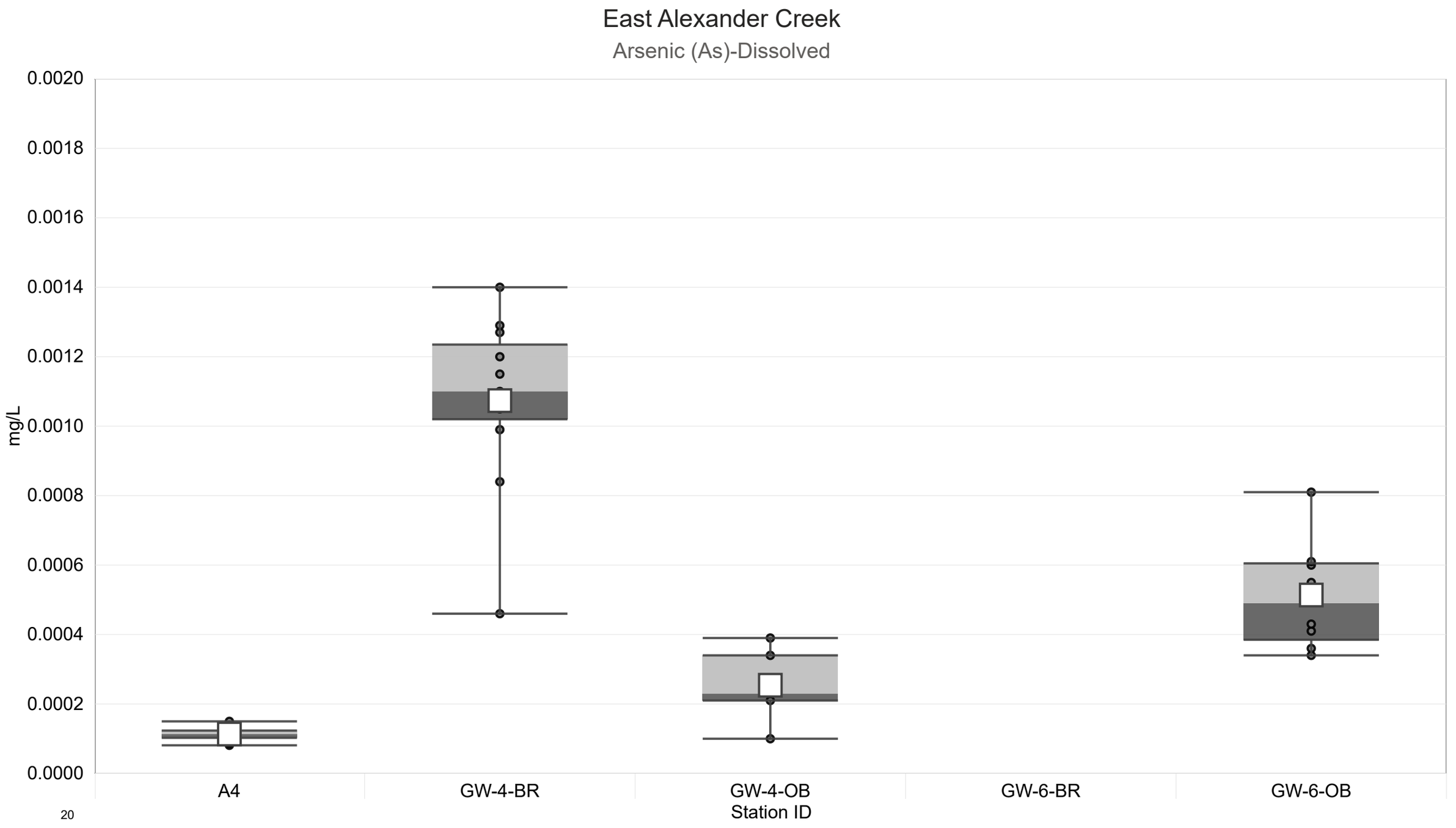

East Alexander Creek
Cadmium (Cd)-Dissolved
0.0005
0.0004
0.0004
0.0003
0.0003
0.0003
0.0002
0.0001
0.0001
5.000...
0.0000
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID

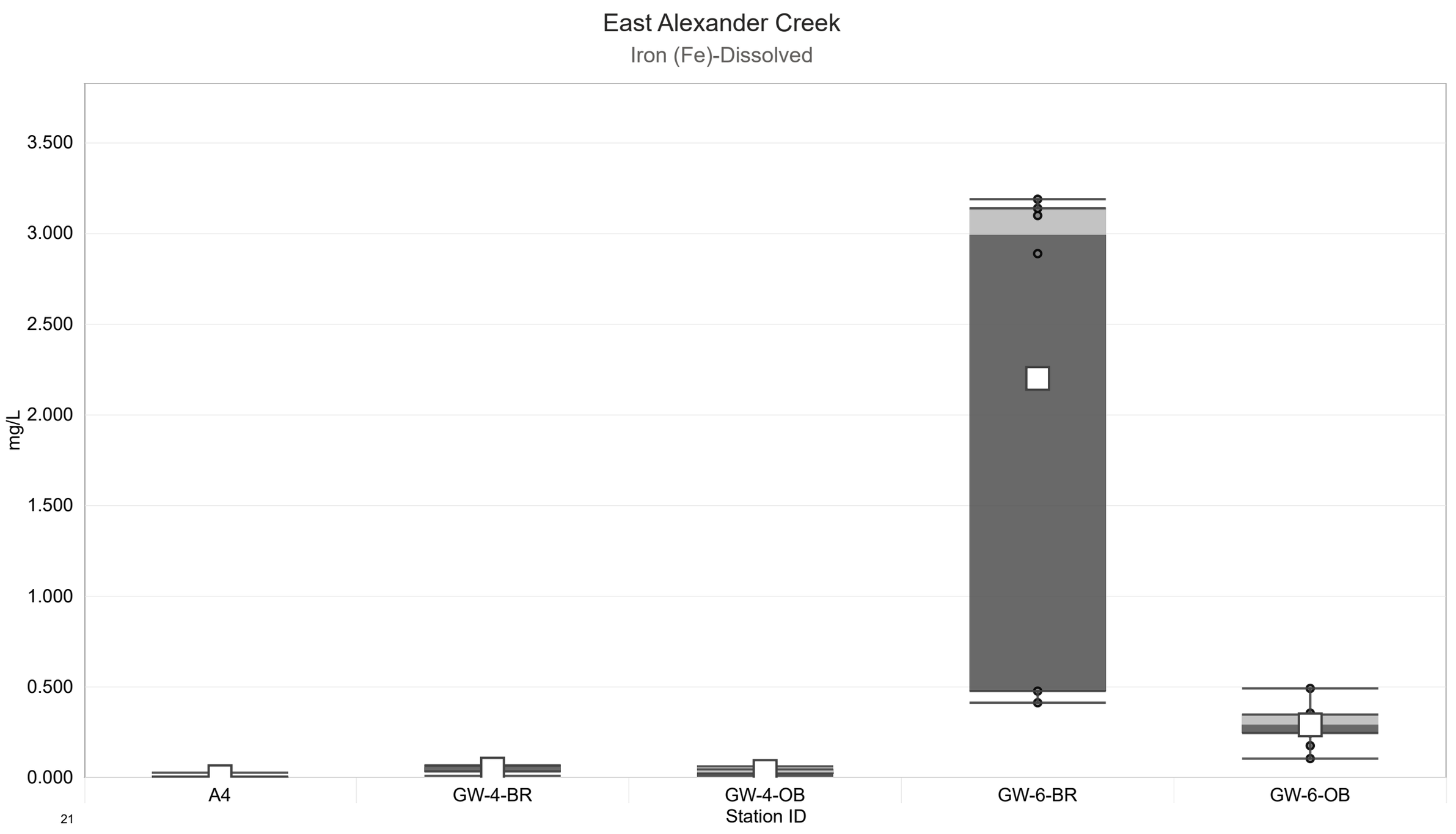
East Alexander Creek

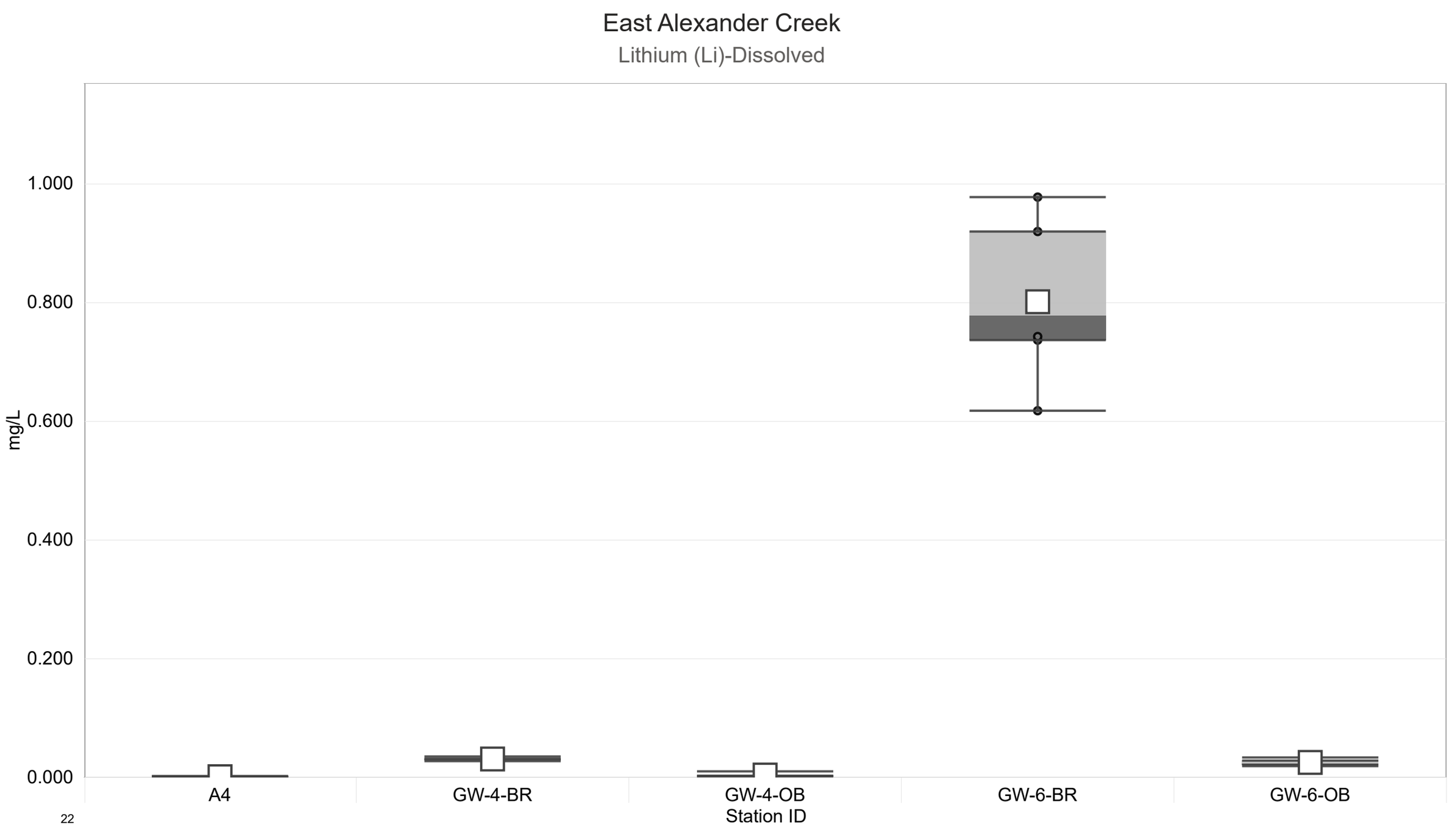
Sulphate (SO4)

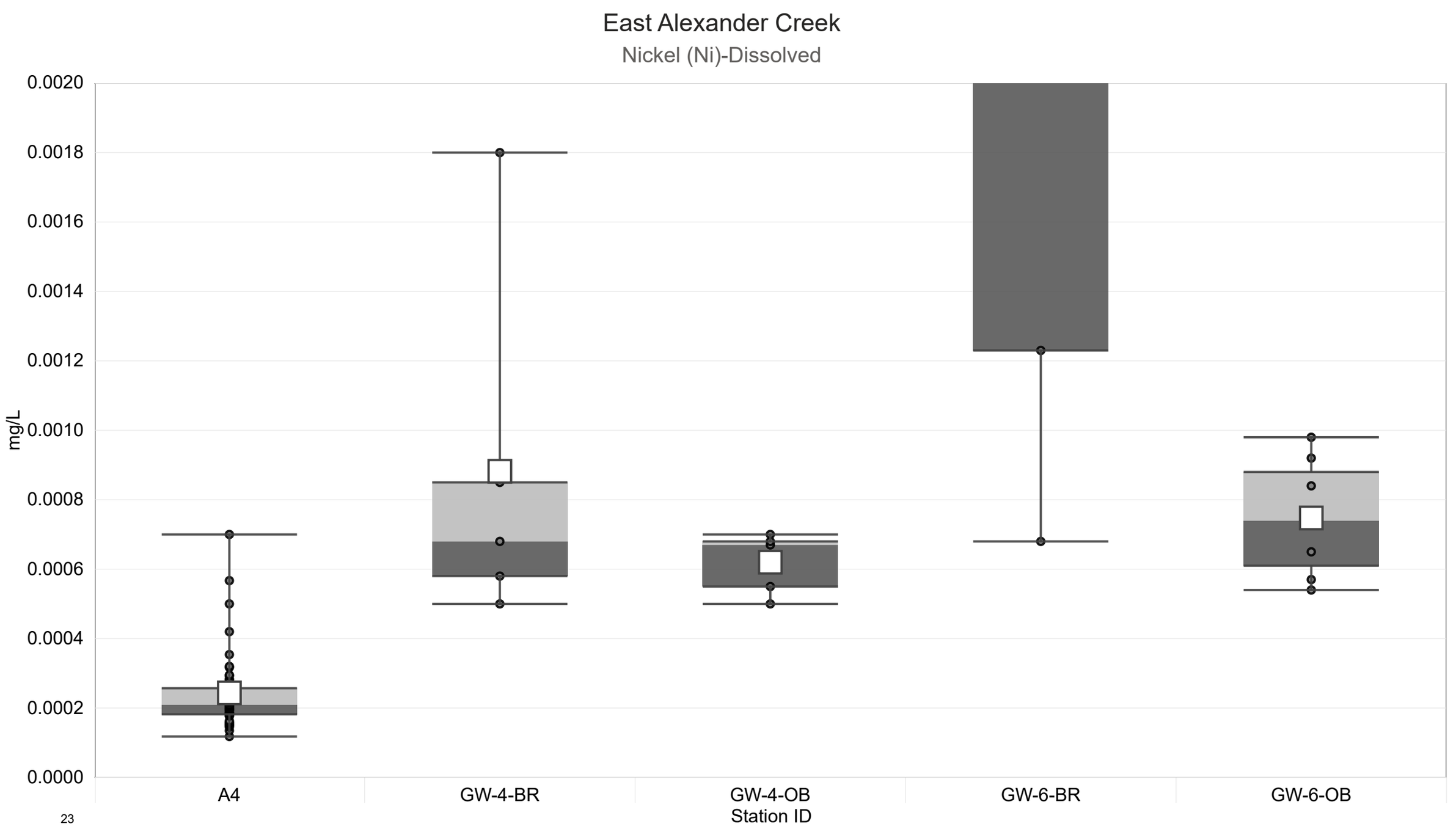


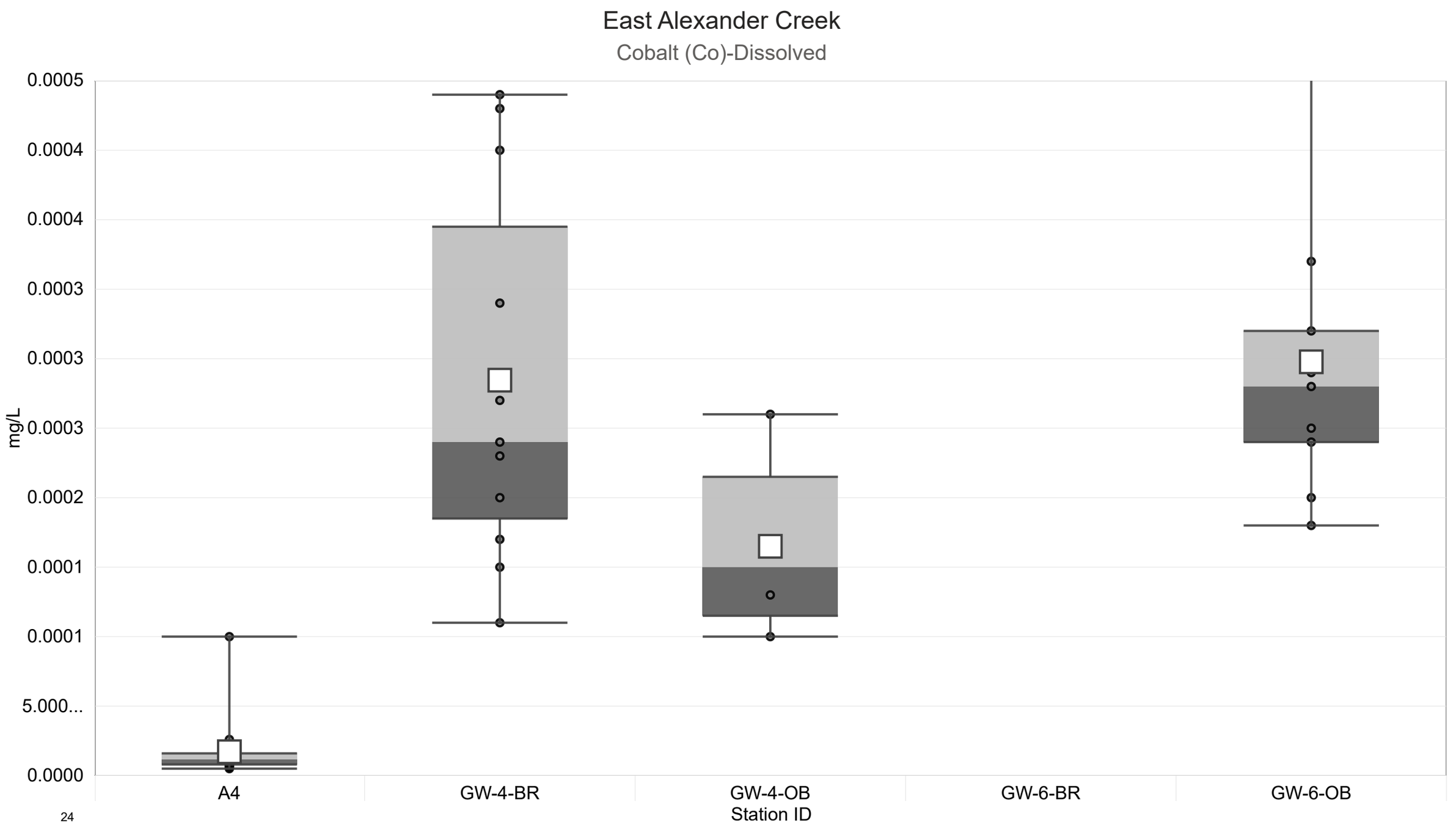

East Alexander Creek
Selenium (Se)-Dissolved
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID

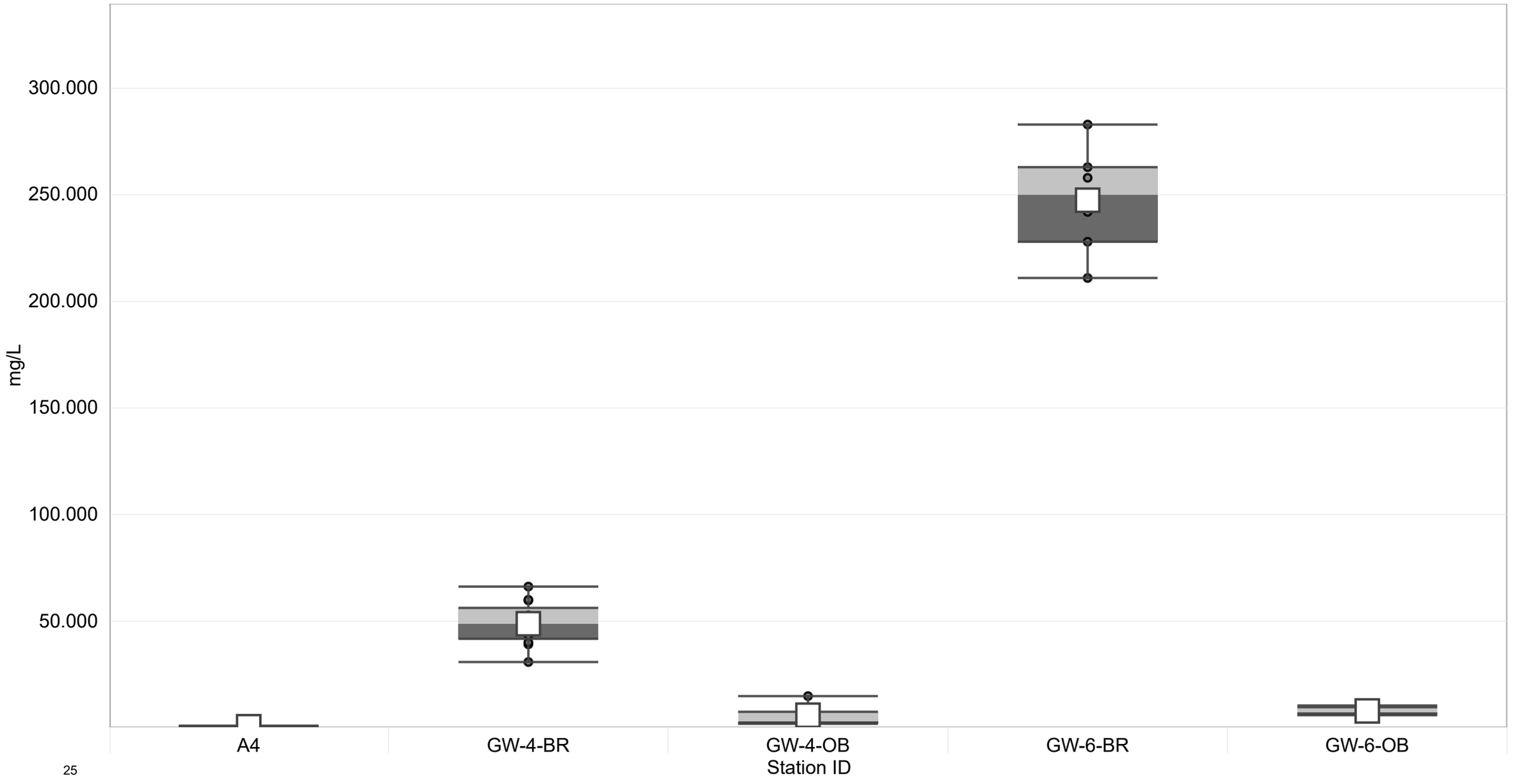

East Alexander Creek
Arsenic (As)-Dissolved
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID

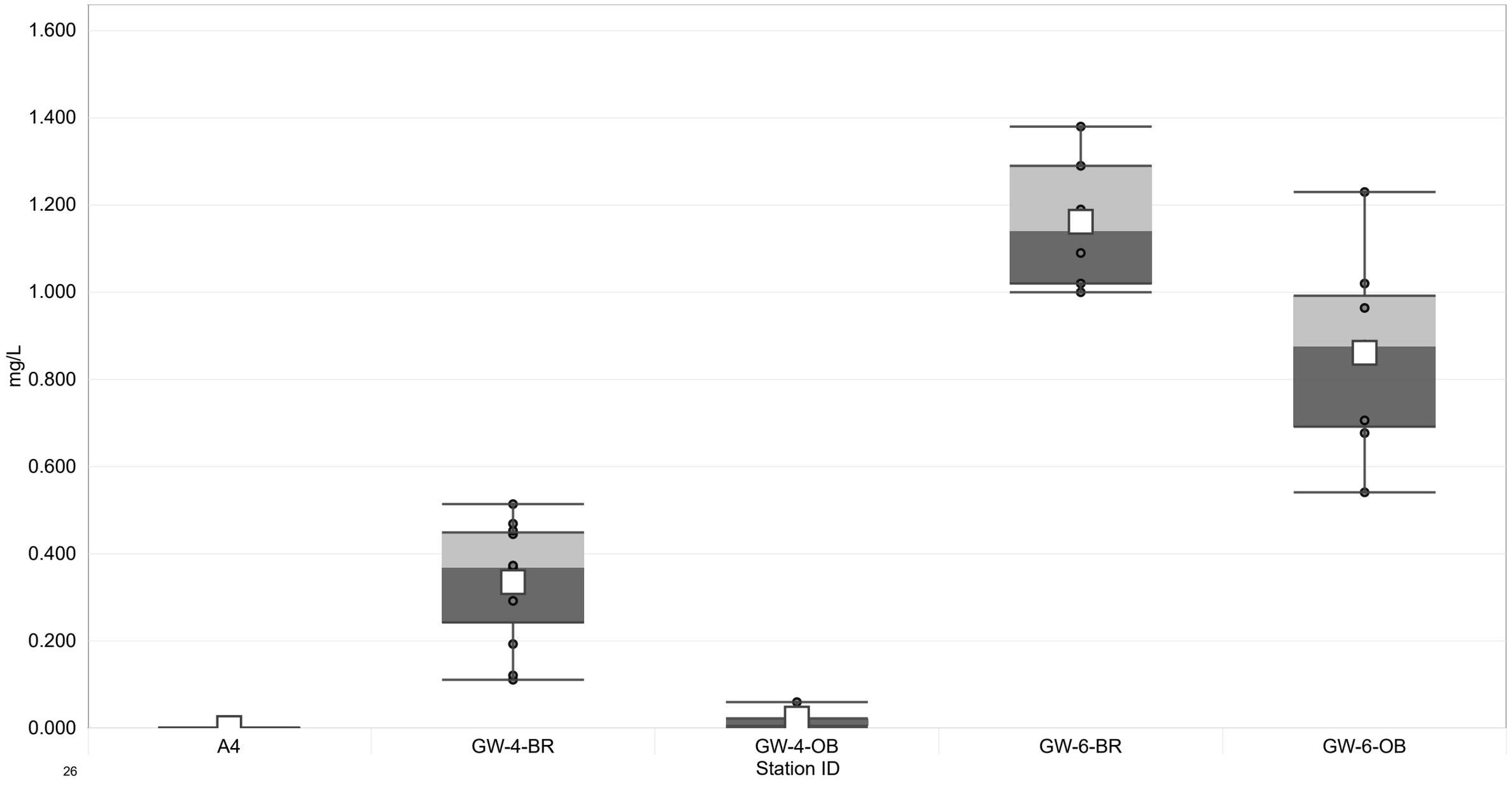

East Alexander Creek
Iron (Fe)-Dissolved
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID

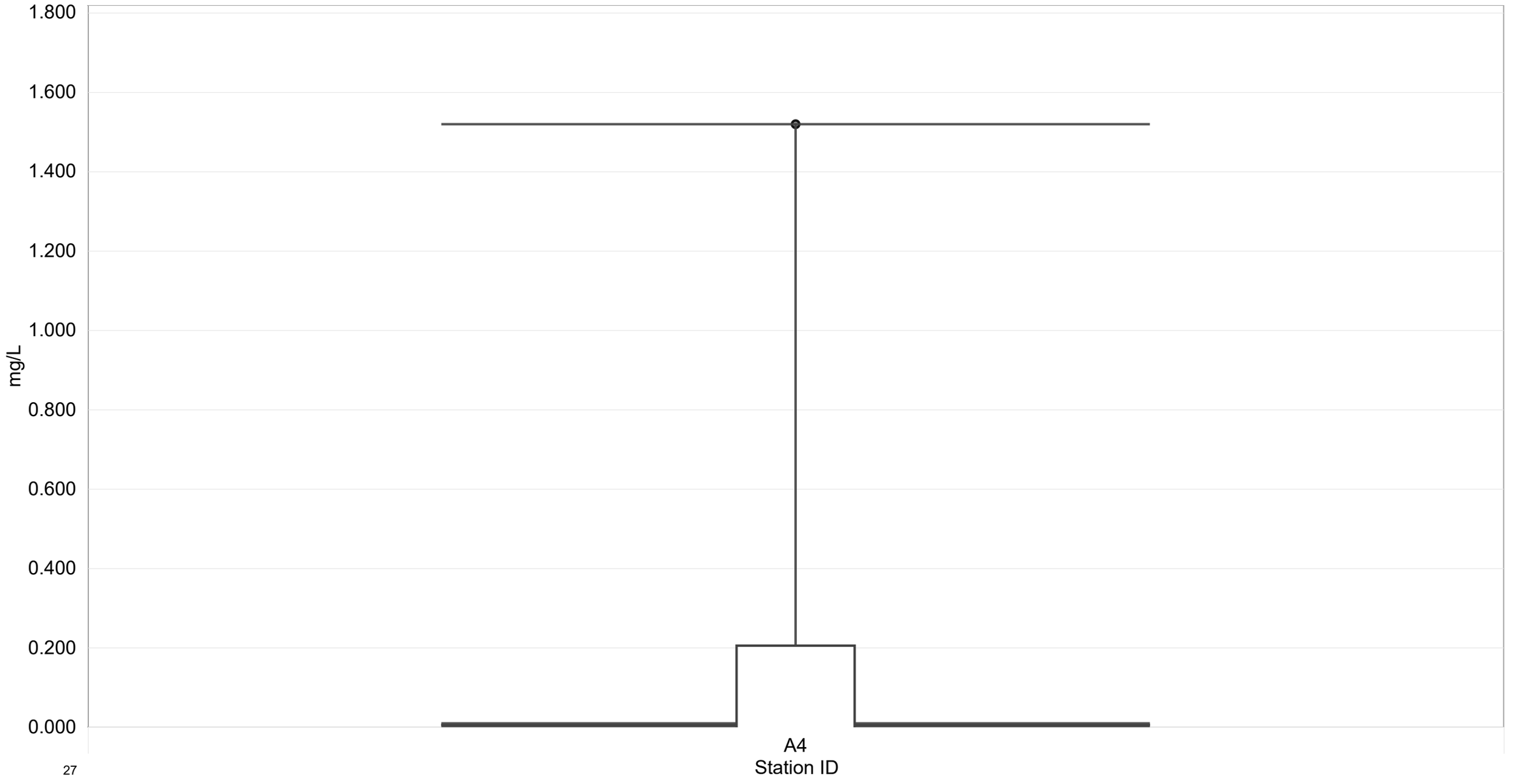

East Alexander Creek
Lithium (Li)-Dissolved
1.000
0.800
0.600
0.400
0.200
0.000
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID


East Alexander Creek
Nickel (Ni)-Dissolved
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID


East Alexander Creek
Cobalt (Co)-Dissolved
0.0005
0.0004
0.0004
0.0003
0.0003
0.0003
0.0002
0.0001
0.0001
5.000...
0.0000
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID

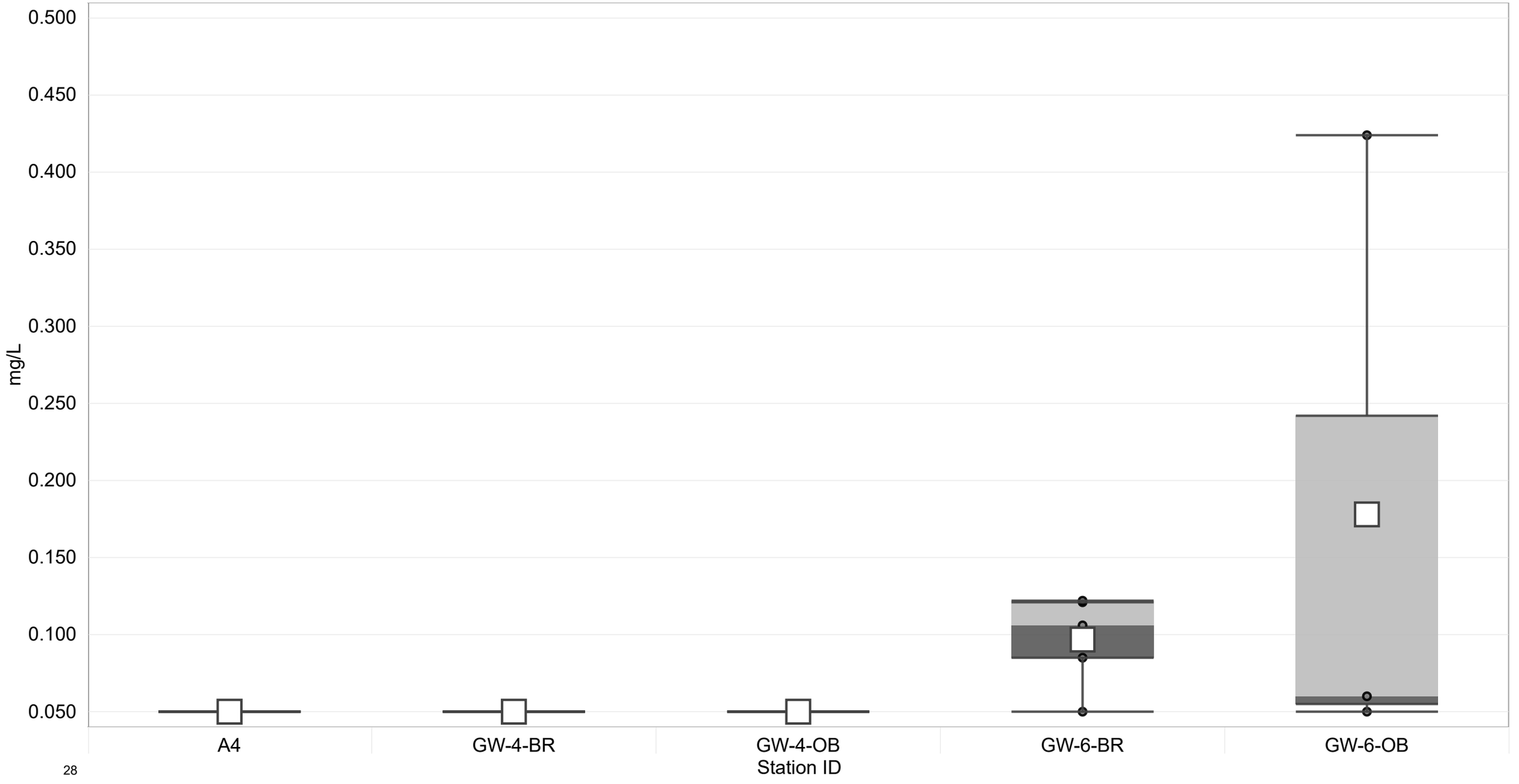

East Alexander Creek
Sodium (Na)-Dissolved
300.000
250.000
200.000
150.000
100.000
50.000
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID

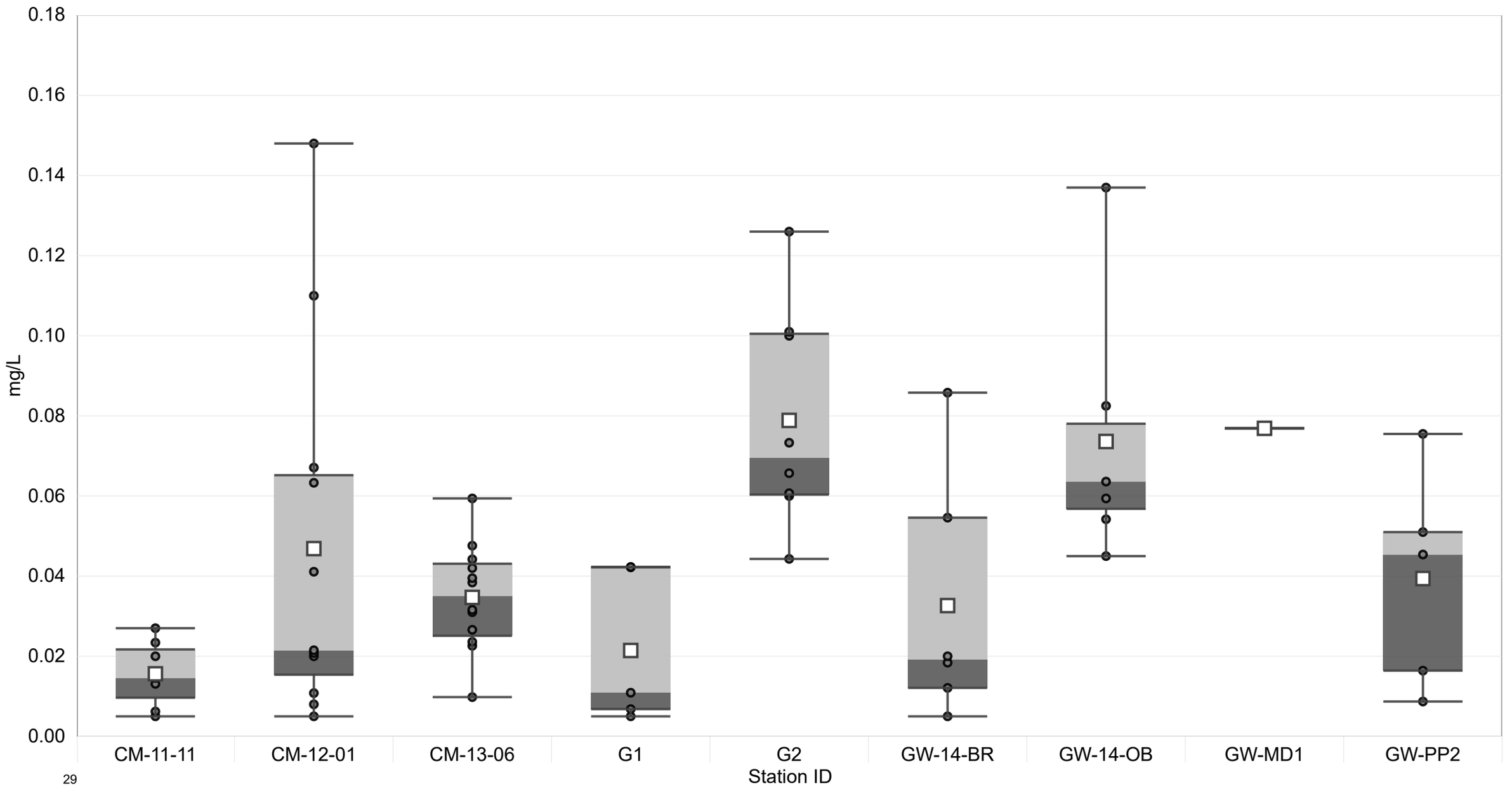

East Alexander Creek
Manganese (Mn)-Dissolved
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
mg/L
A4
GW-4-BR
GW-4-OB
GW-6-BR
GW-6-OB
Station ID

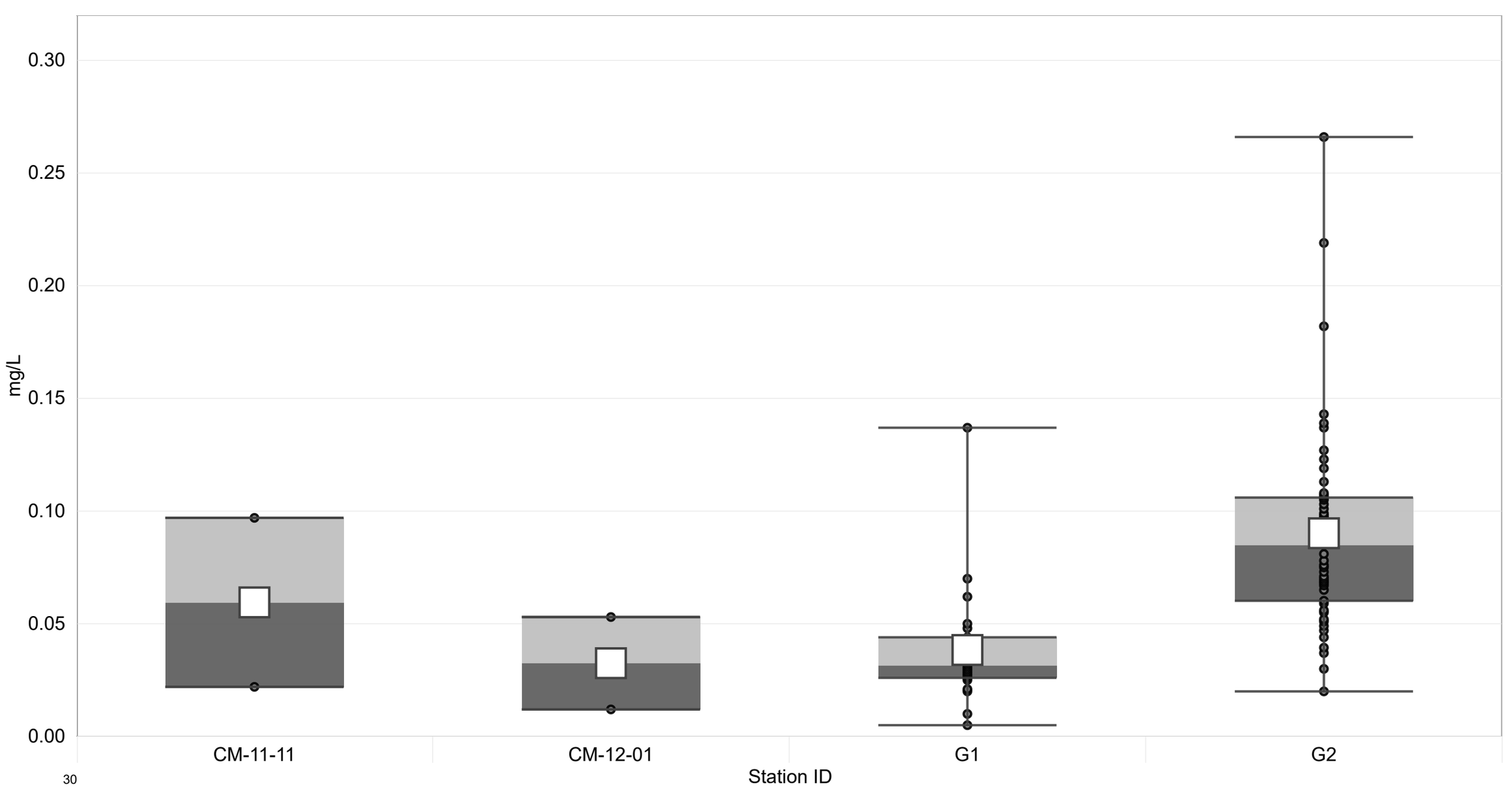

East Alexander Creek
Phosphorus
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
mg/L
A4
Station ID
27

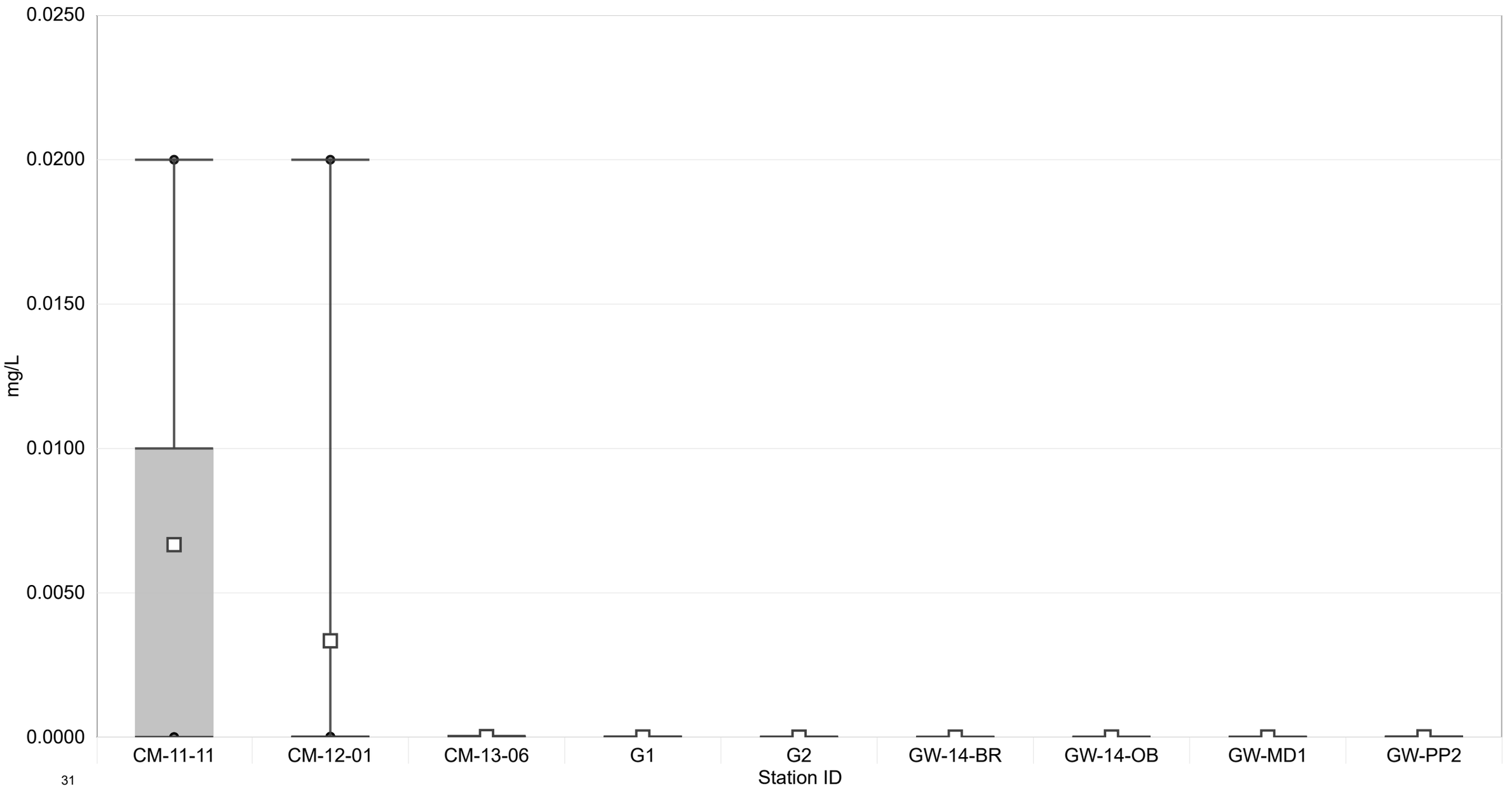
East Alexander Creek

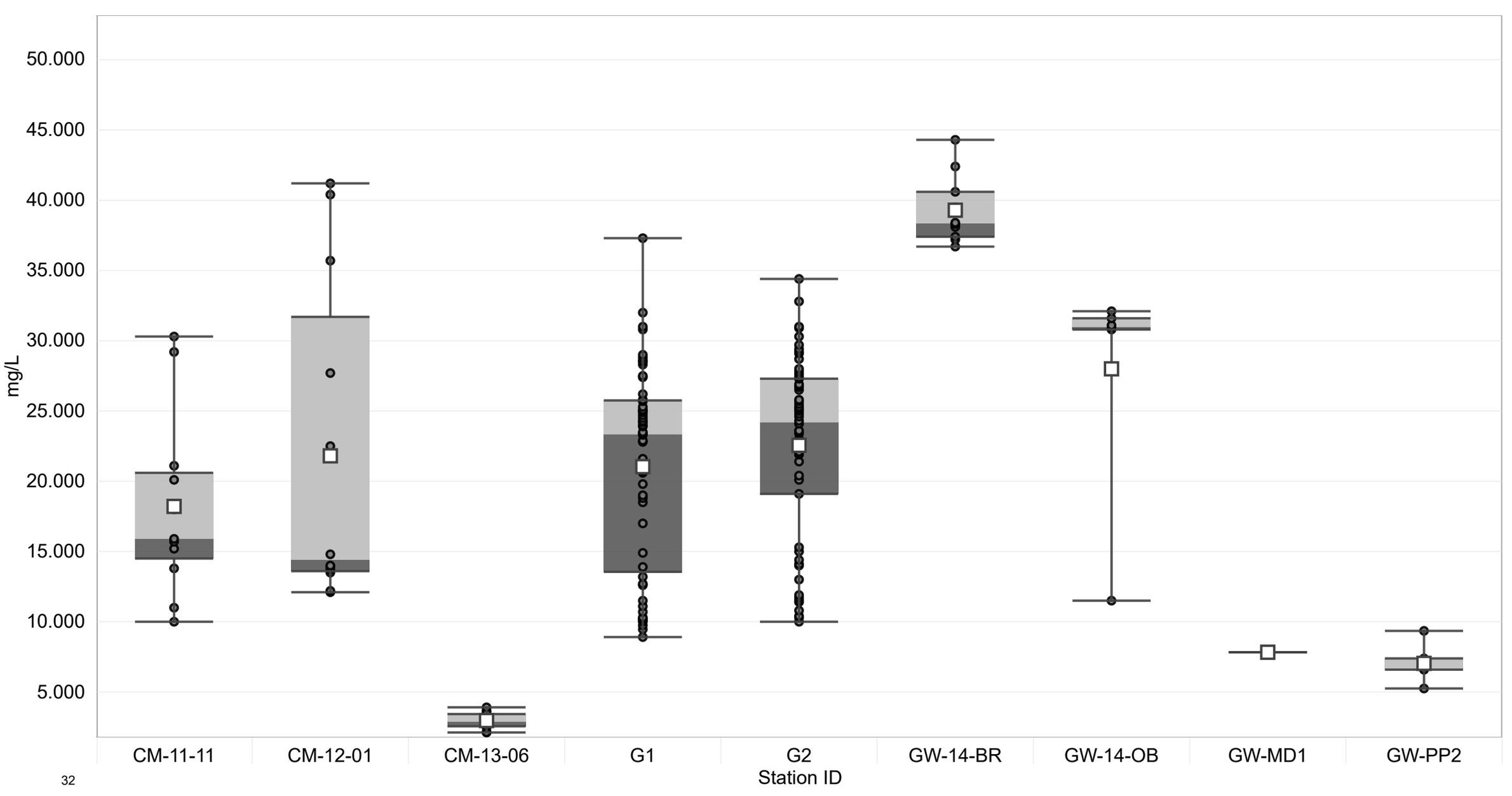
Phosphorus (P)-Dissolved

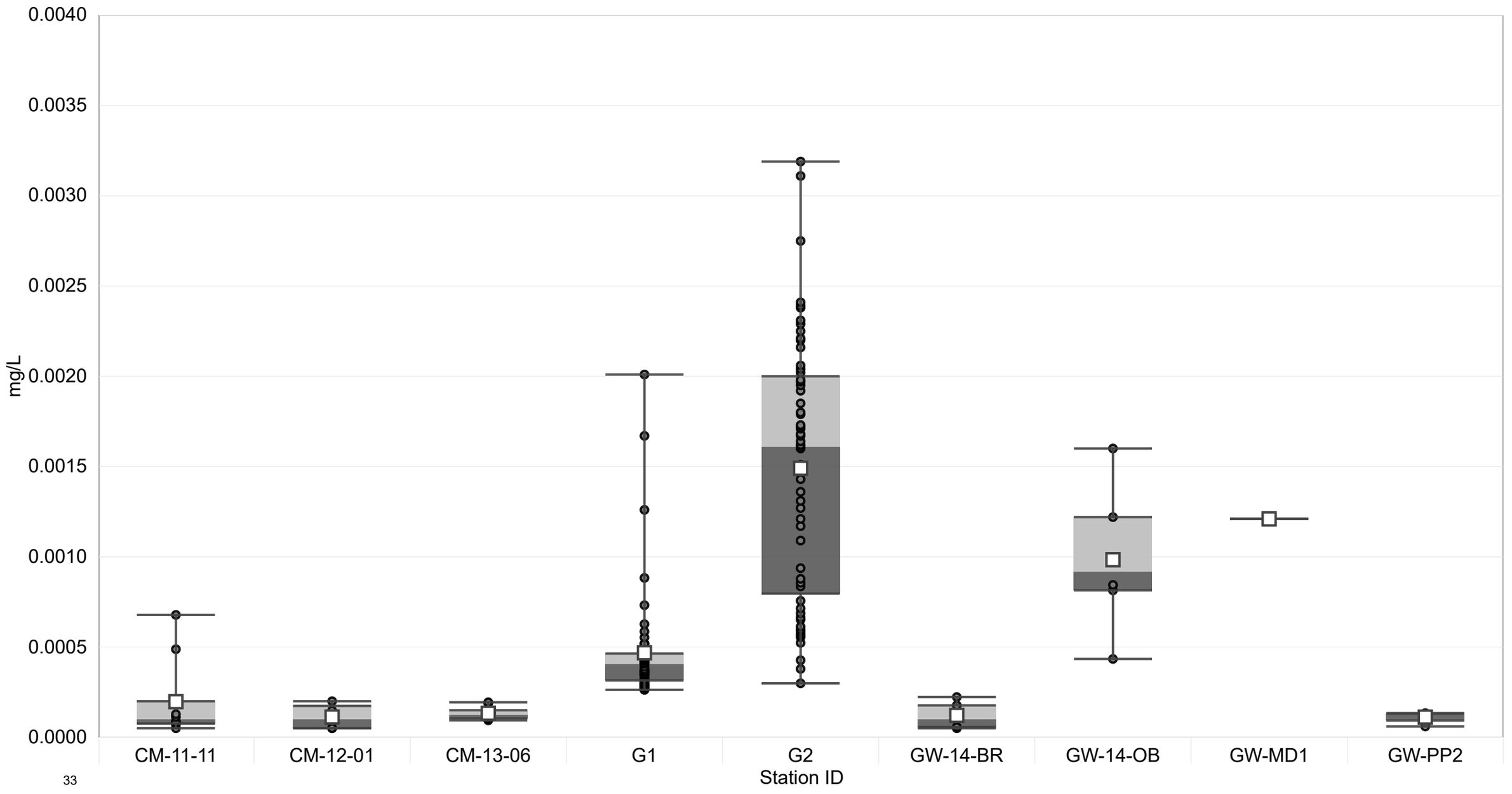


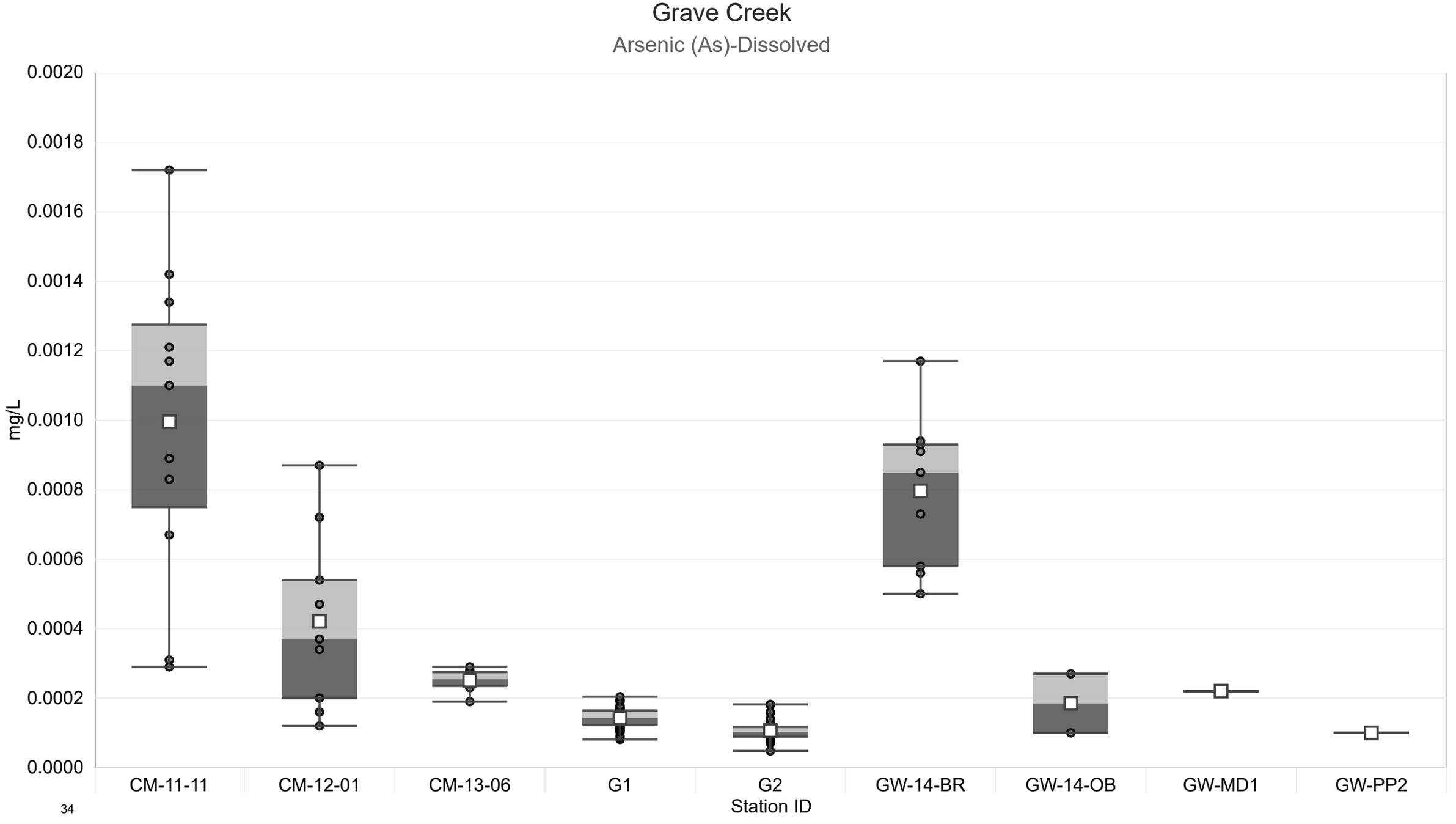

Grave Creek
Nitrate (as N)
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

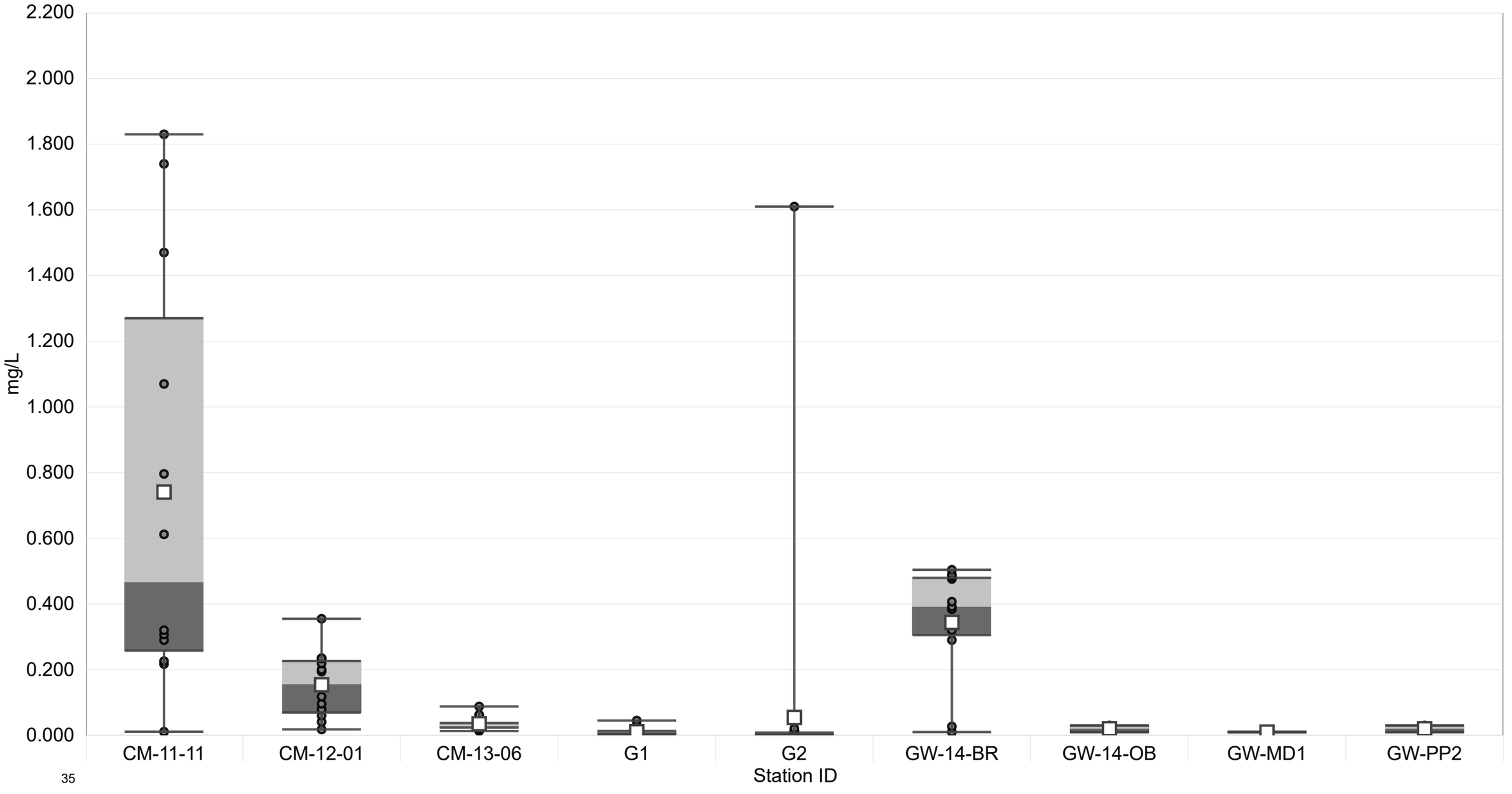

Grave Creek
Nitrate (as NO3-)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
mg/L
CM-11-11
CM-12-01
G1
G2
Station ID

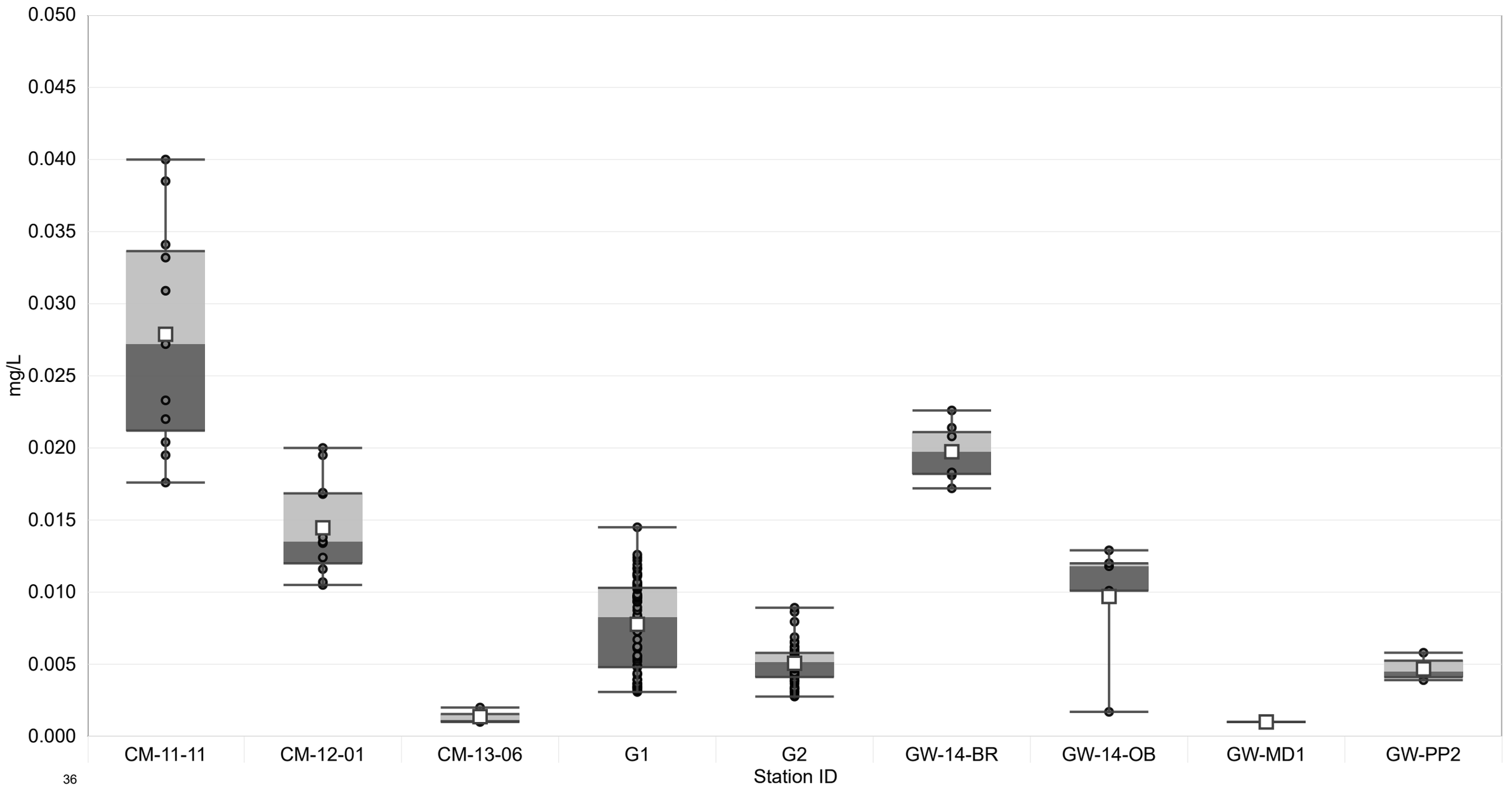

Grave Creek
Cadmium (Cd)-Dissolved
0.0250
0.0200
0.0150
0.0100
0.0050
0.0000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

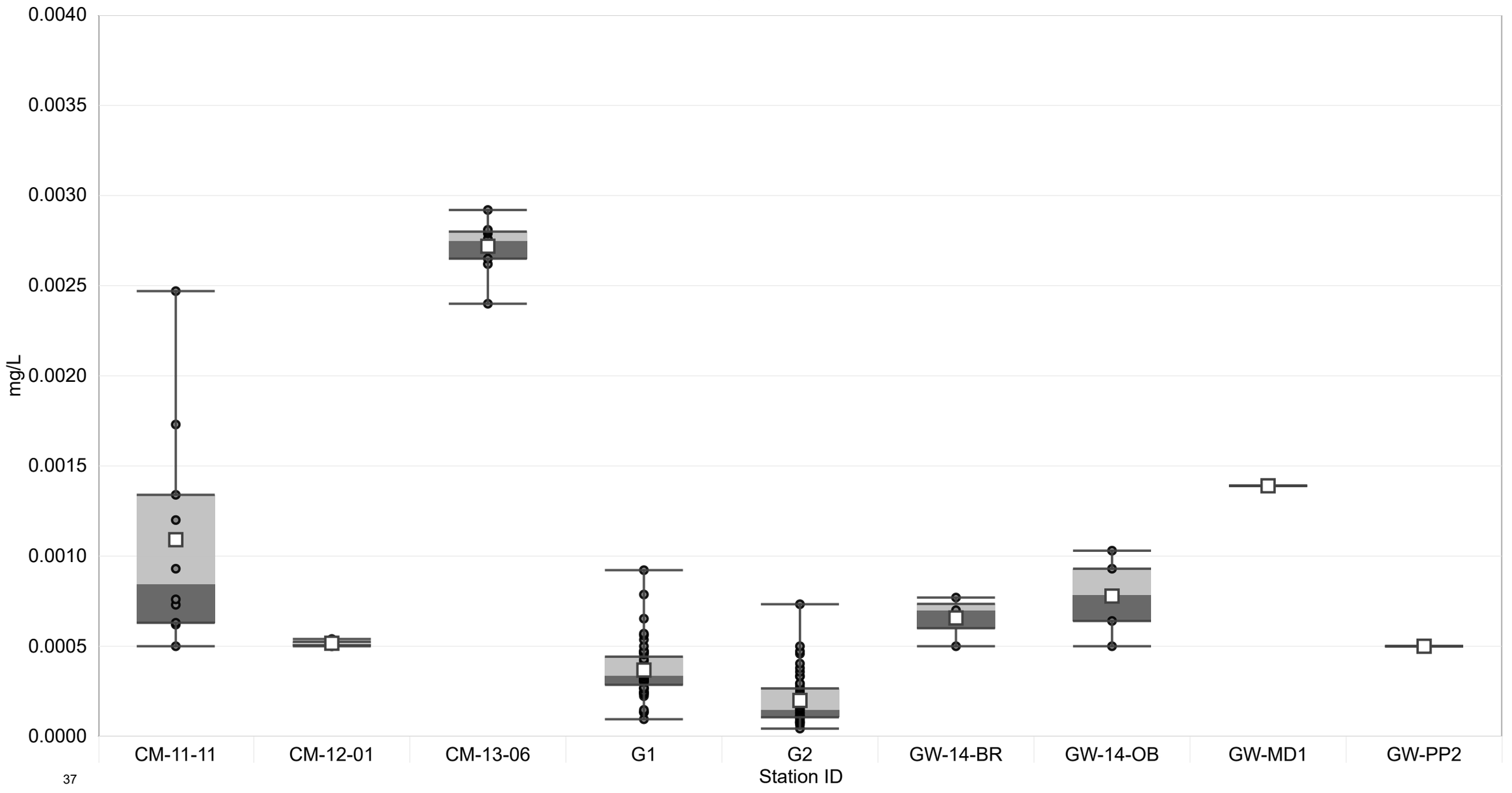

Grave Creek
Sulphate (SO4)
50.000
45.000
40.000
35.000
30.000
25.000
20.000
15.000
10.000
5.000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

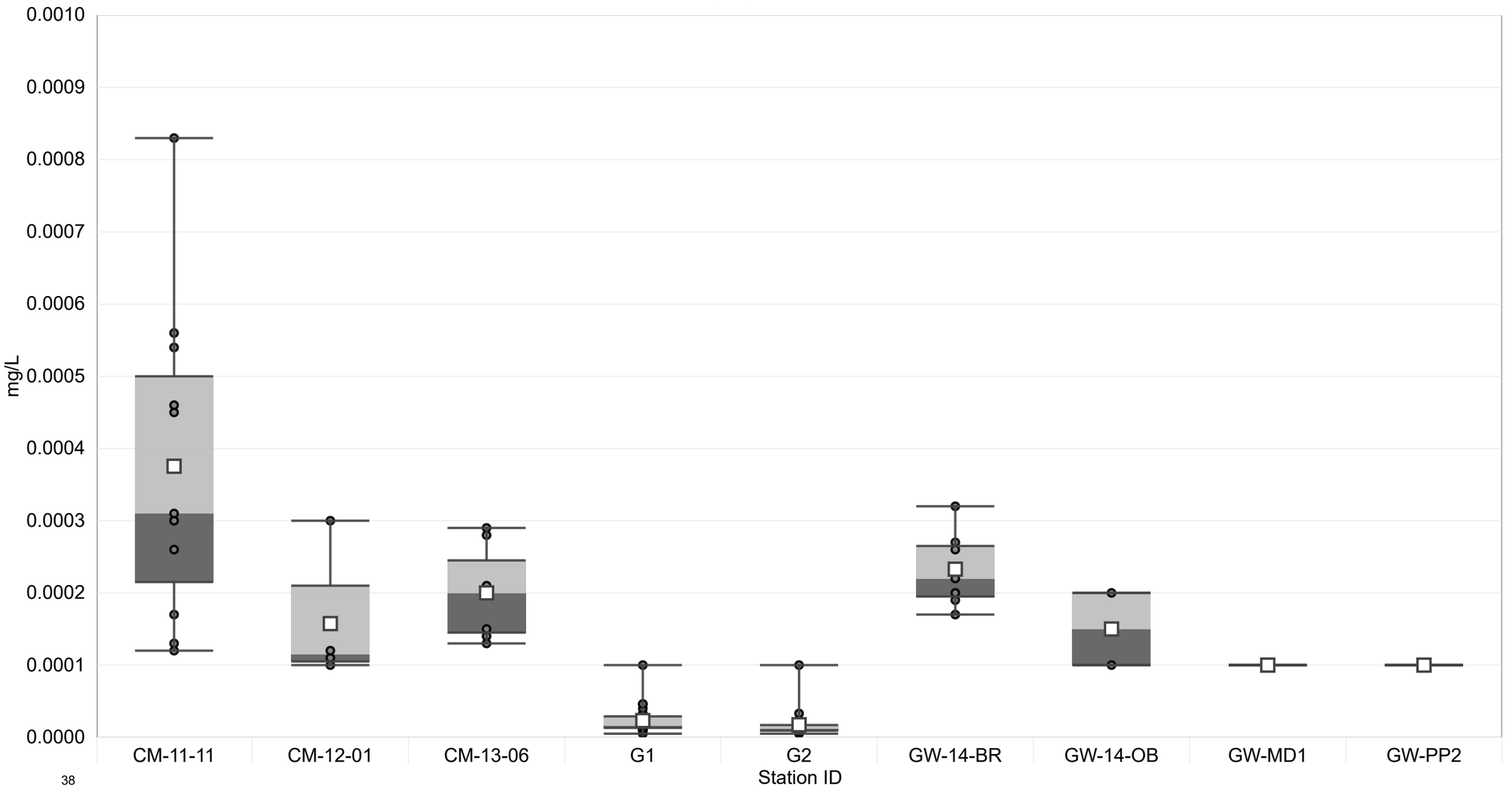

Grave Creek
Selenium (Se)-Dissolved
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

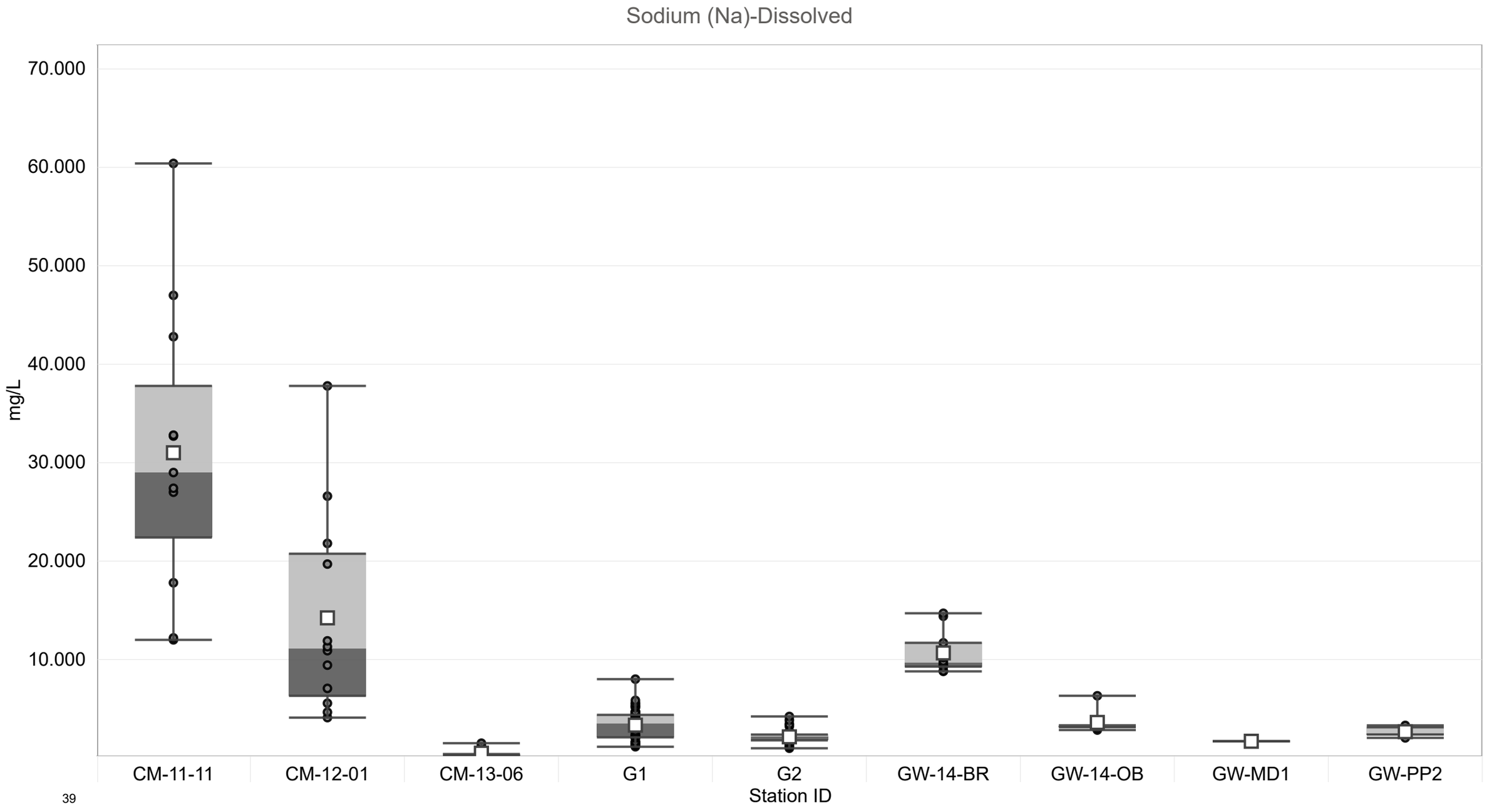

Grave Creek
Arsenic (As)-Dissolved
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

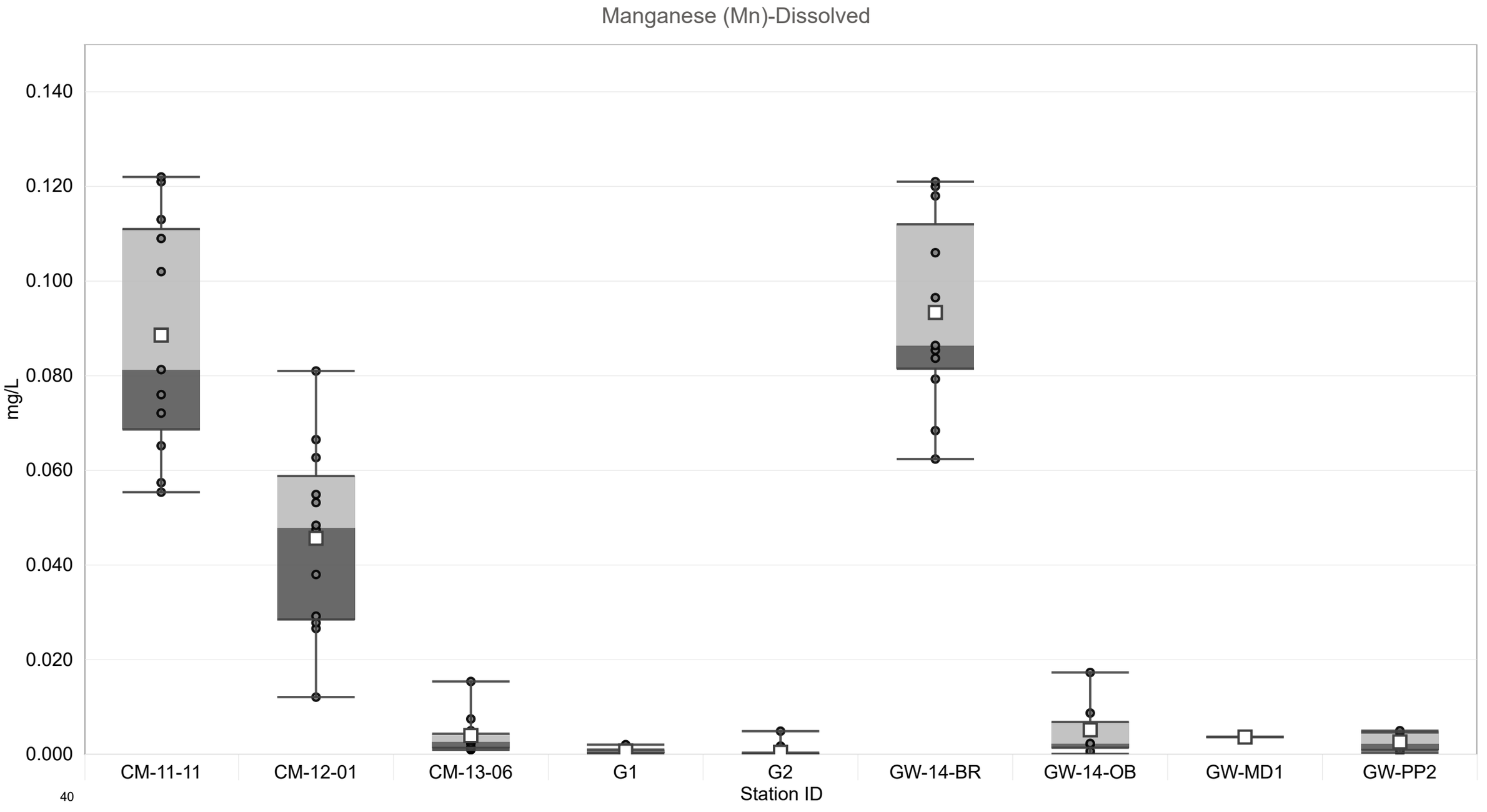

Grave Creek
Iron (Fe)-Dissolved
2.200
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID


Grave Creek
Lithium (Li)-Dissolved
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID


Grave Creek
Nickel (Ni)-Dissolved
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

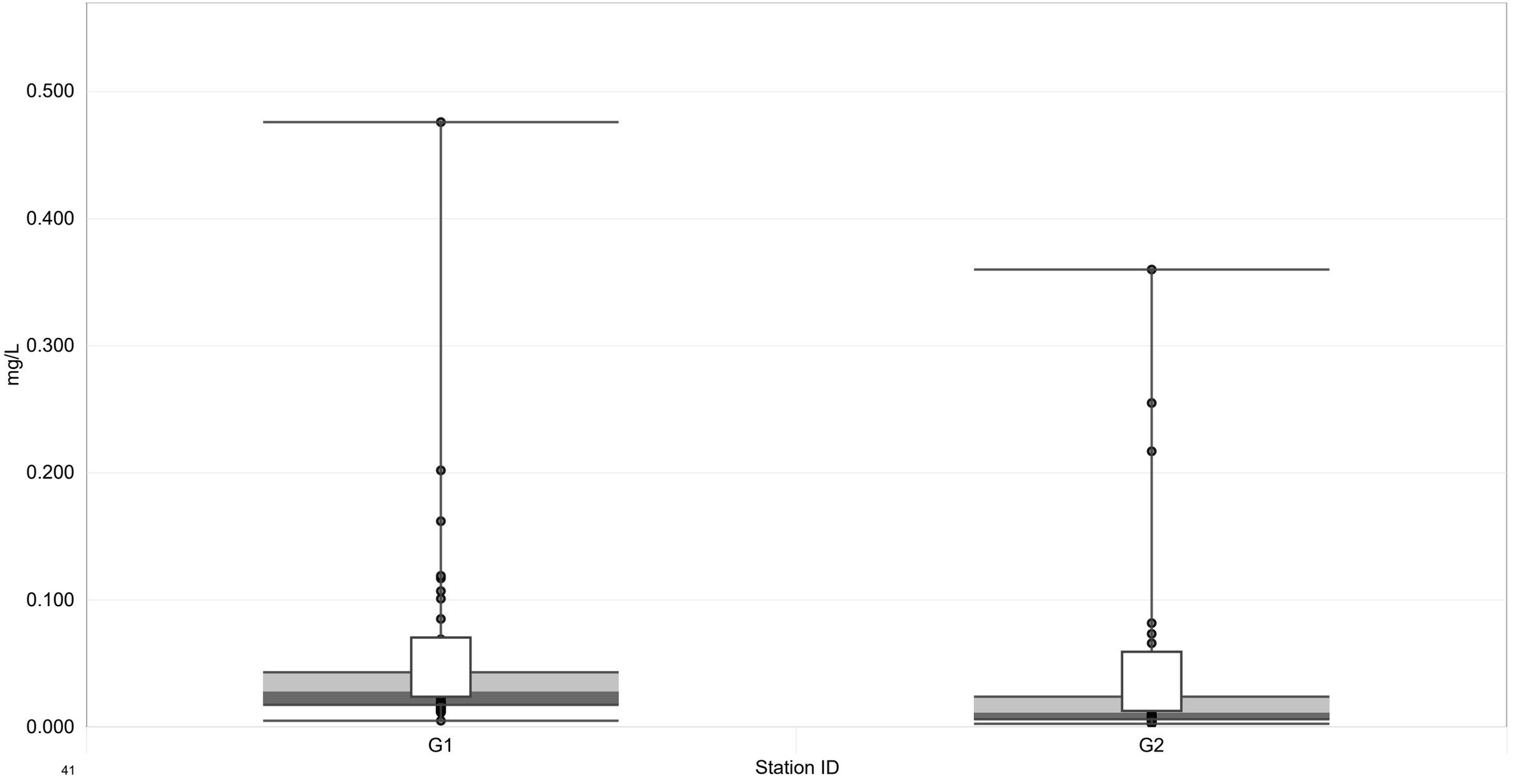

Grave Creek
Cobalt (Co)-Dissolved
0.0010
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

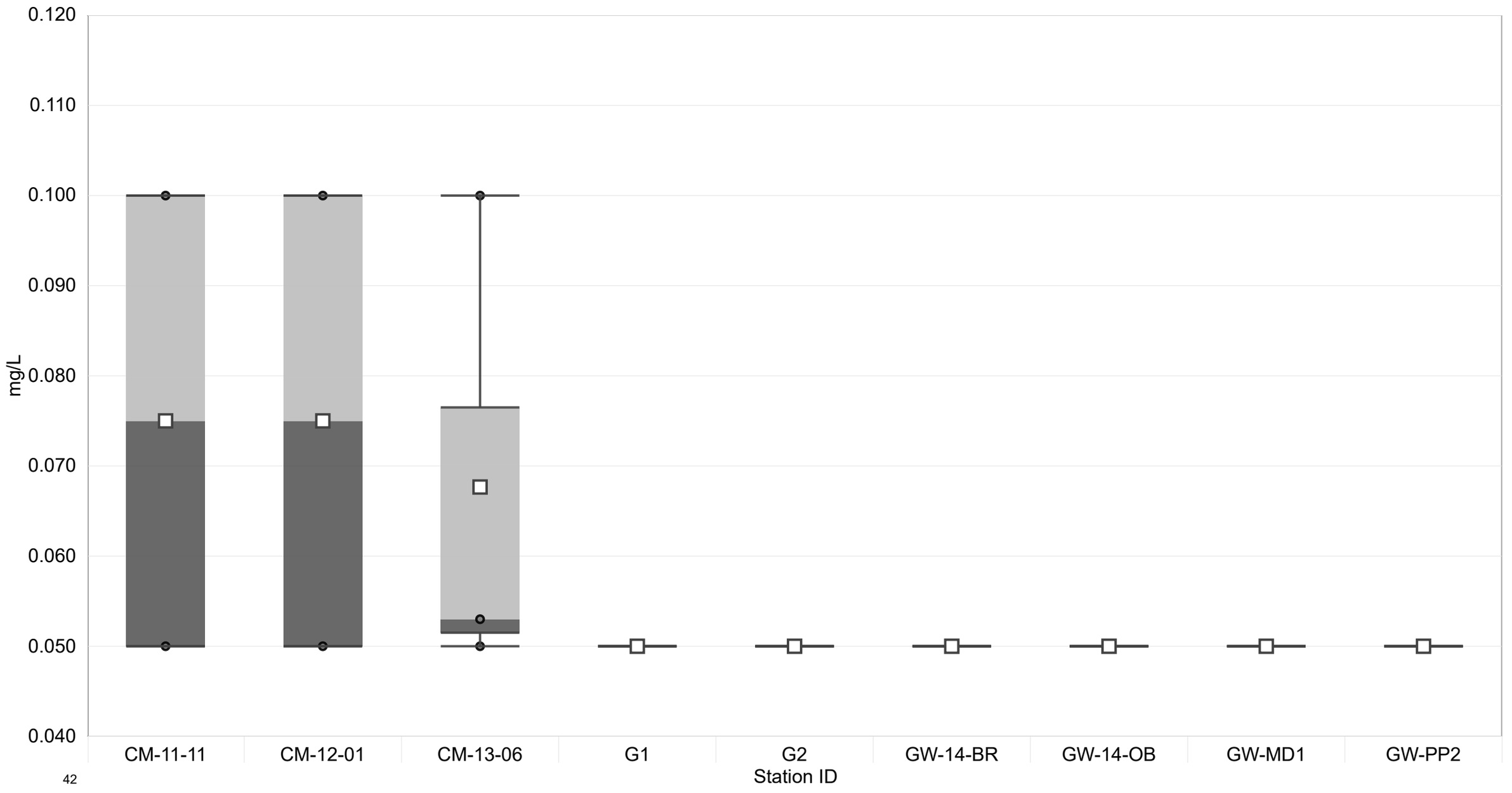

Grave Creek
Sodium (Na)-Dissolved
70.000
60.000
50.000
40.000
30.000
20.000
10.000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

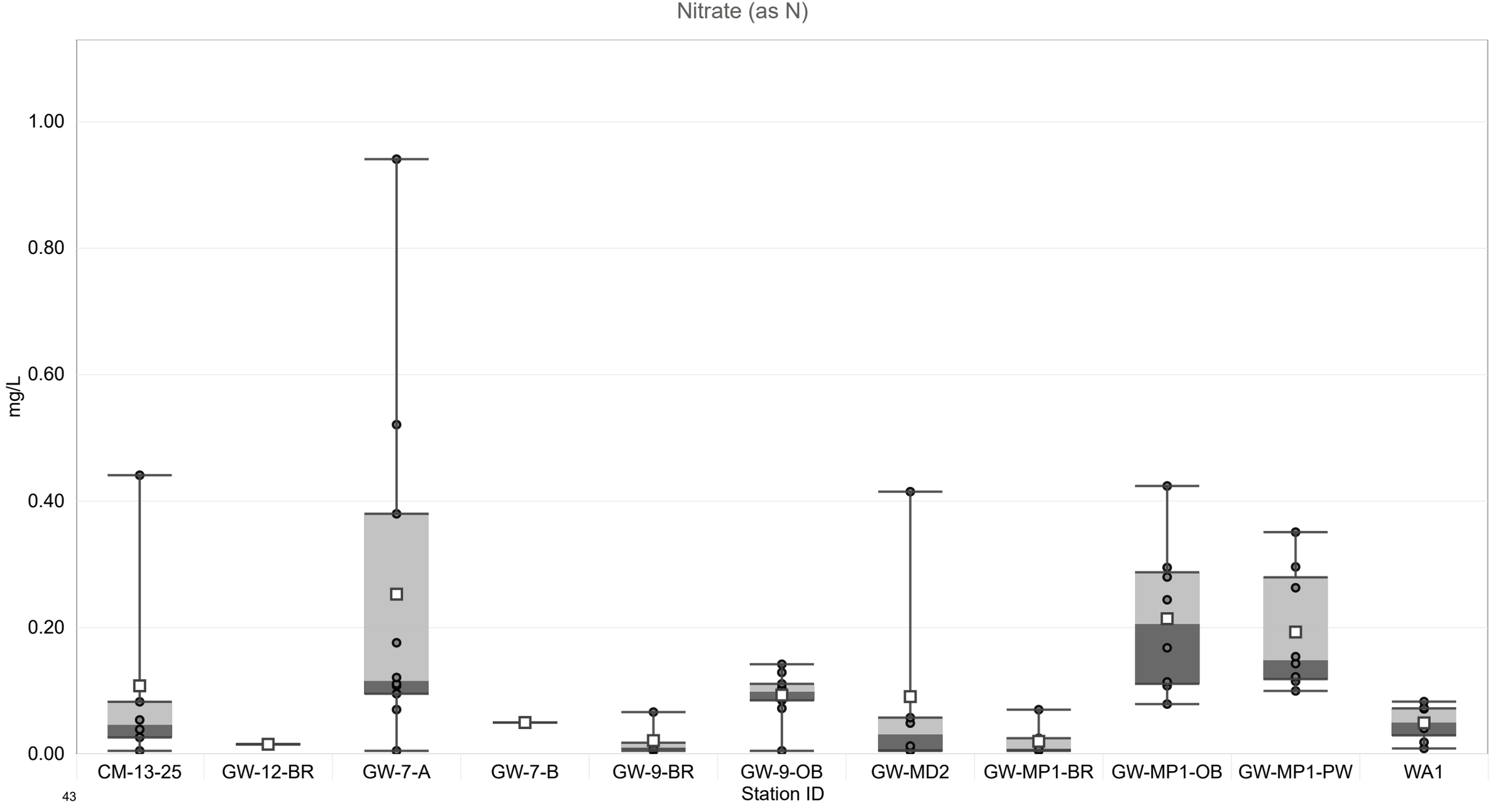

Grave Creek
Manganese (Mn)-Dissolved
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

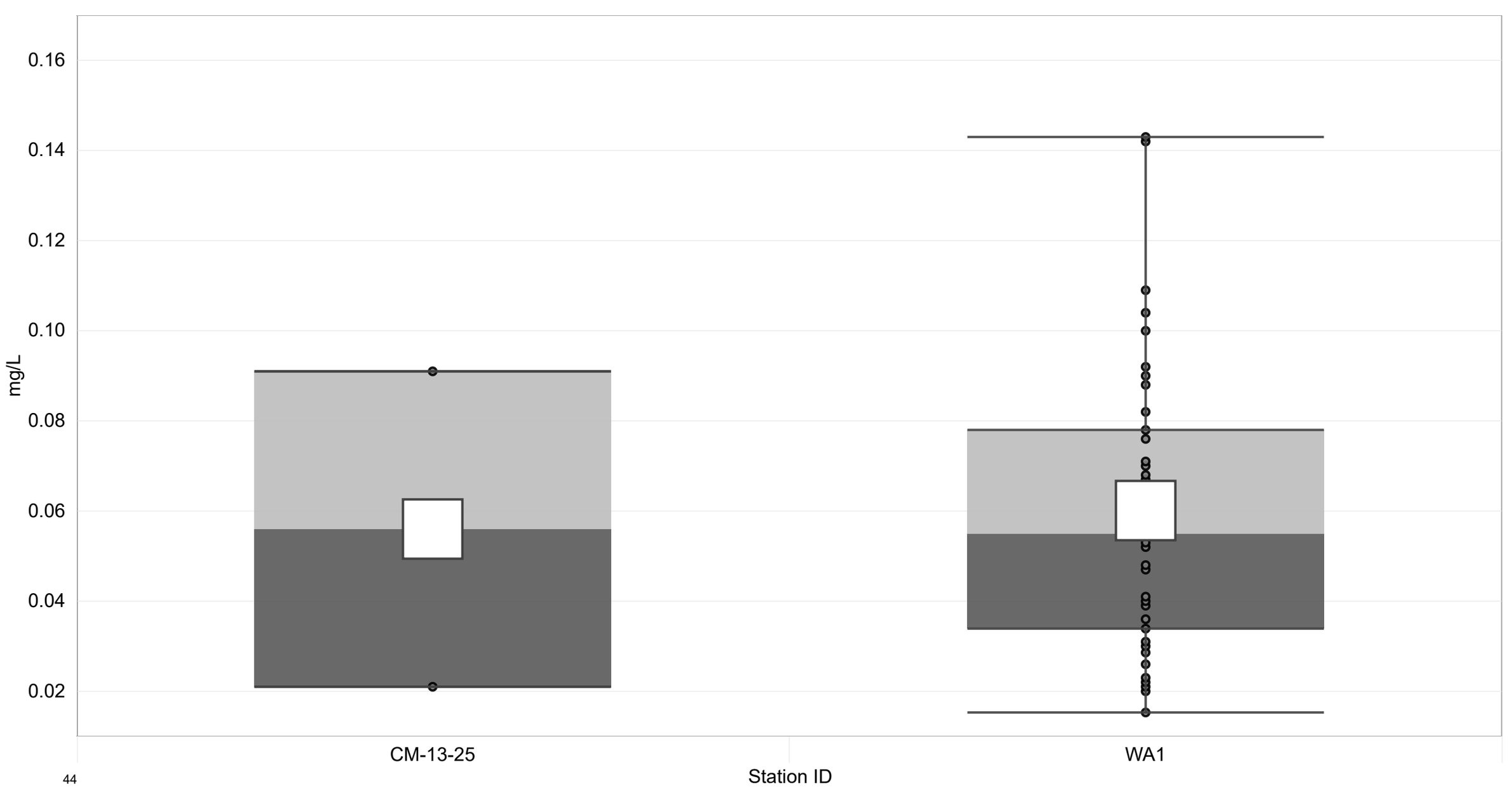
Grave Creek

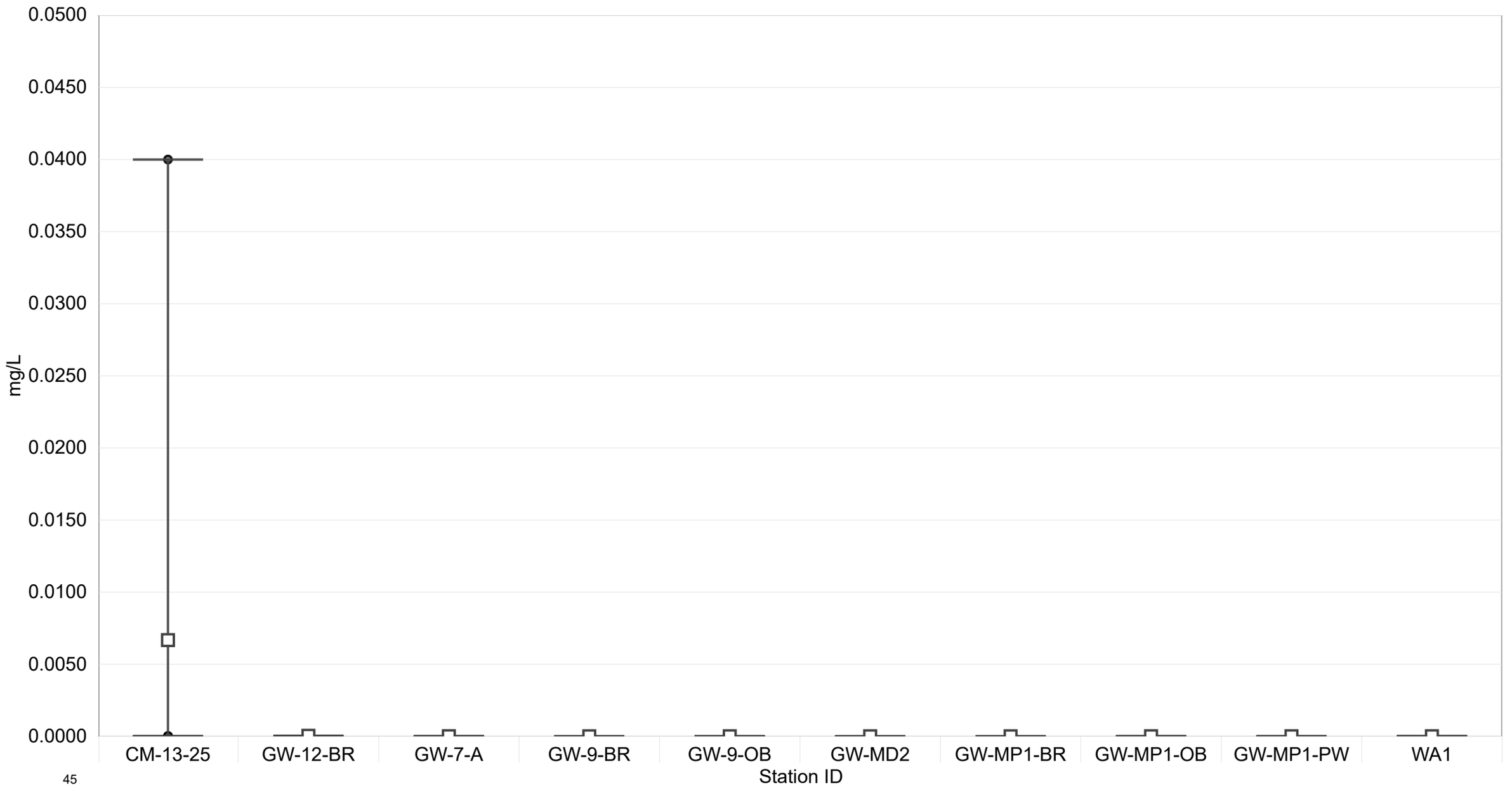
Phosphorus




Grave Creek
Phosphorus (P)-Dissolved
0.120
0.110
0.100
0.090
0.080
0.070
0.060
0.050
0.040
mg/L
CM-11-11
CM-12-01
CM-13-06
G1
G2
GW-14-BR
GW-14-OB
GW-MD1
GW-PP2
Station ID

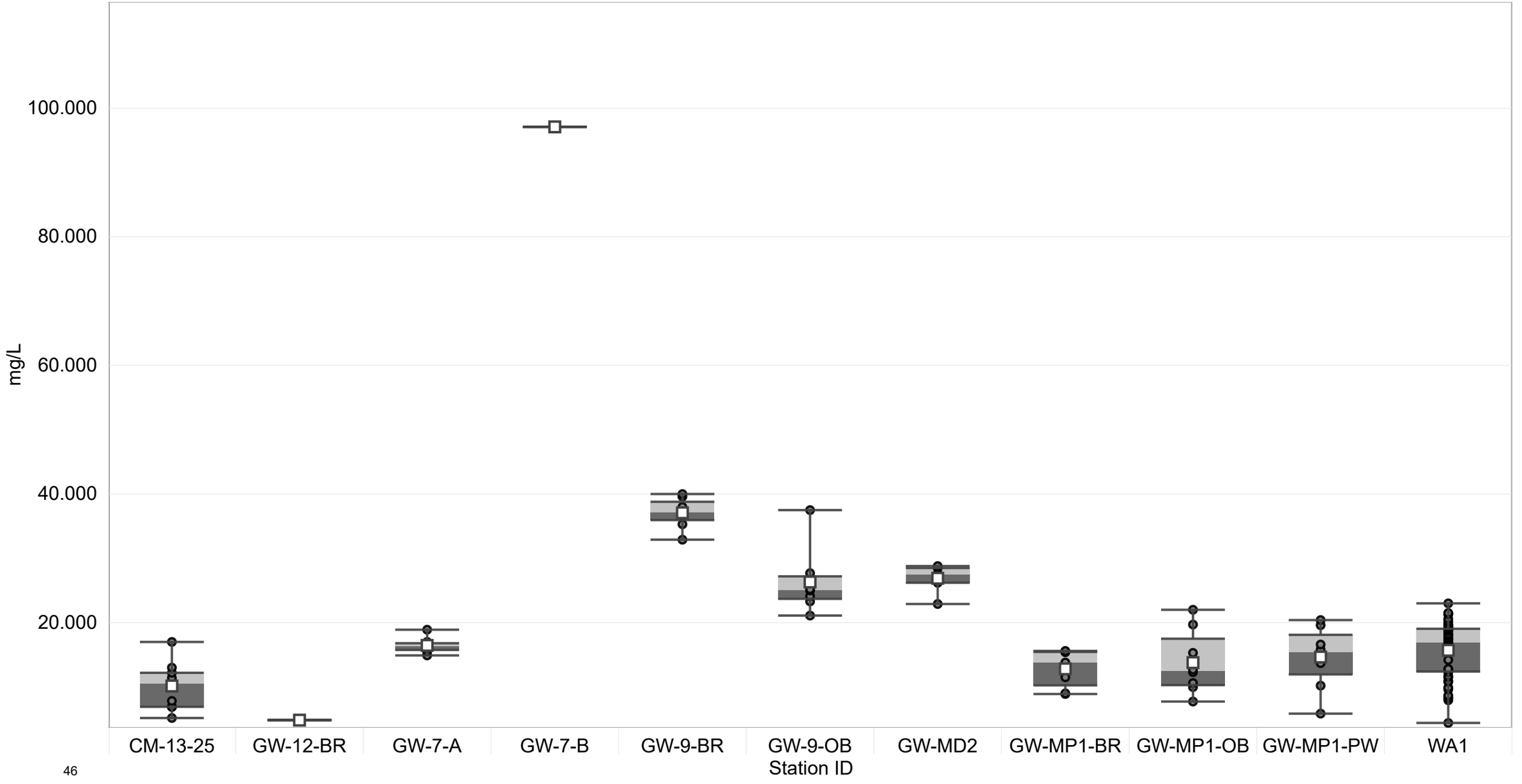

West Alexander Creek
Nitrate (as N)
mg/L
1.00
0.80
0.60
0.40
0.20
0.00
CM-13-25
GW-12-BR
GW-7-A
GW-7-B
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID

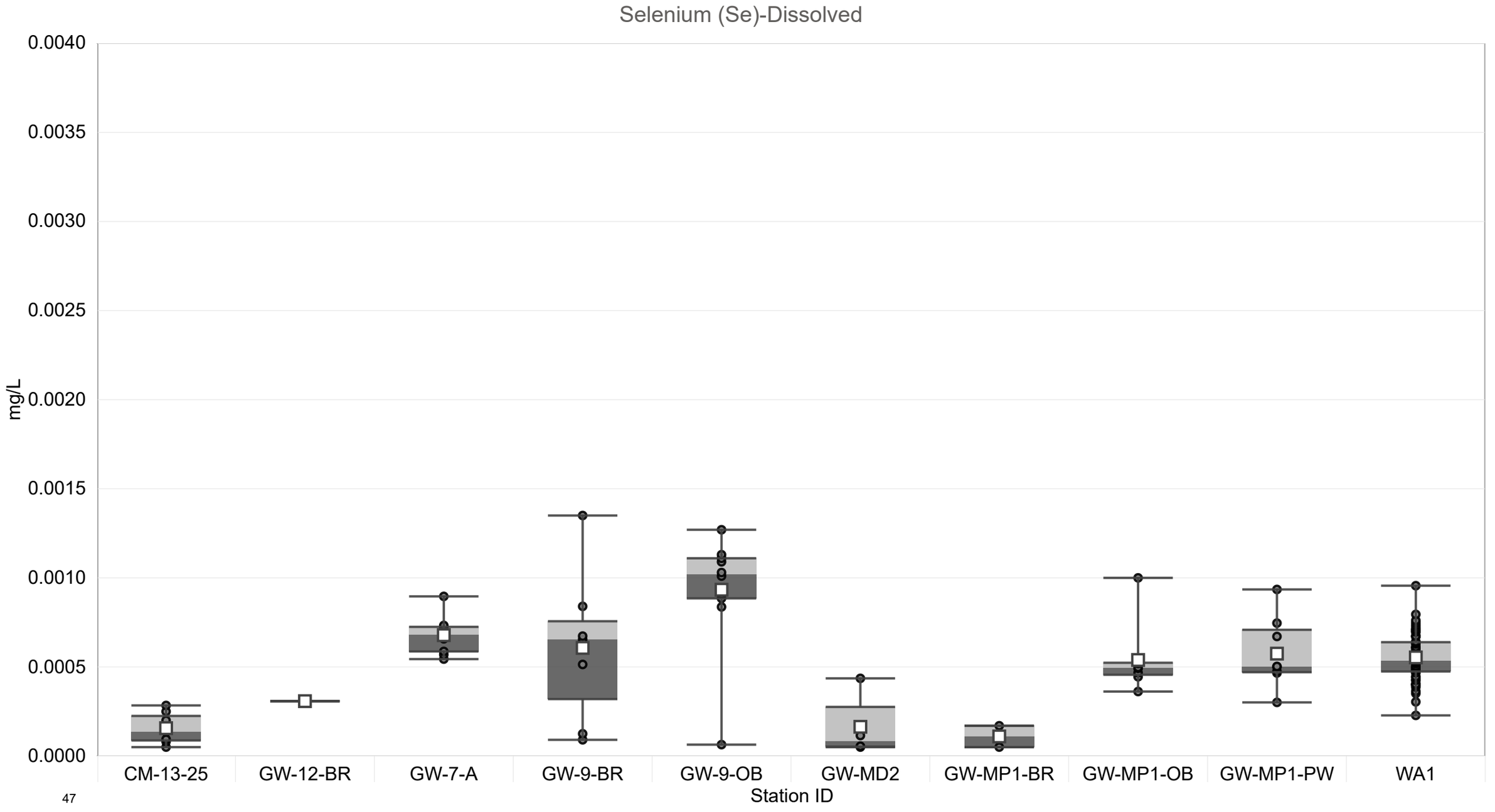

West Alexander Creek
Nitrate (as NO3-)
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
mg/L
CM-13-25
WA1
Station ID

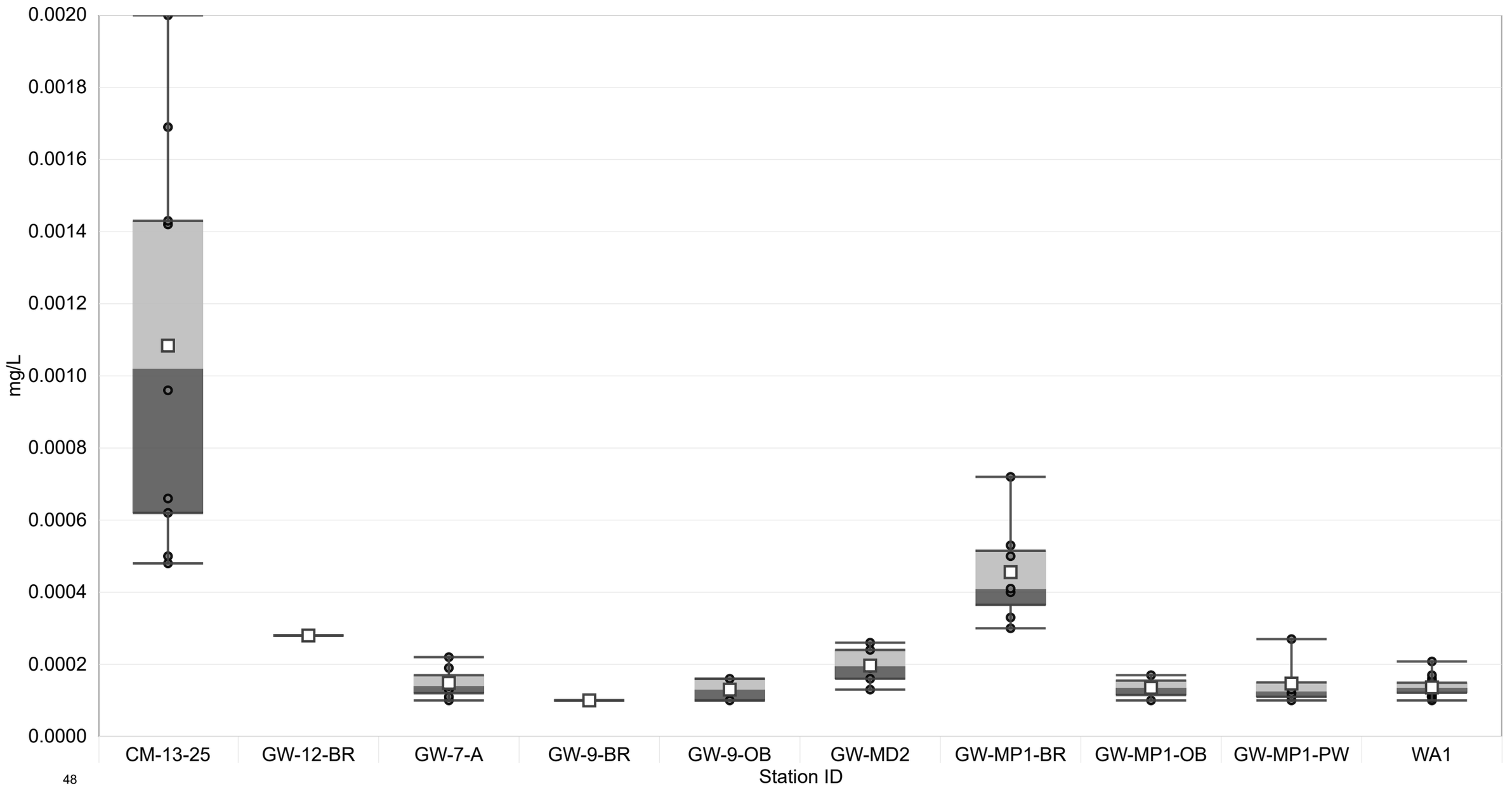

West Alexander Creek
Cadmium (Cd)-Dissolved
0.0500
0.0450
0.0400
0.0350
0.0300
0.0250
0.0200
0.0150
0.0100
0.0050
0.0000
mg/L
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID

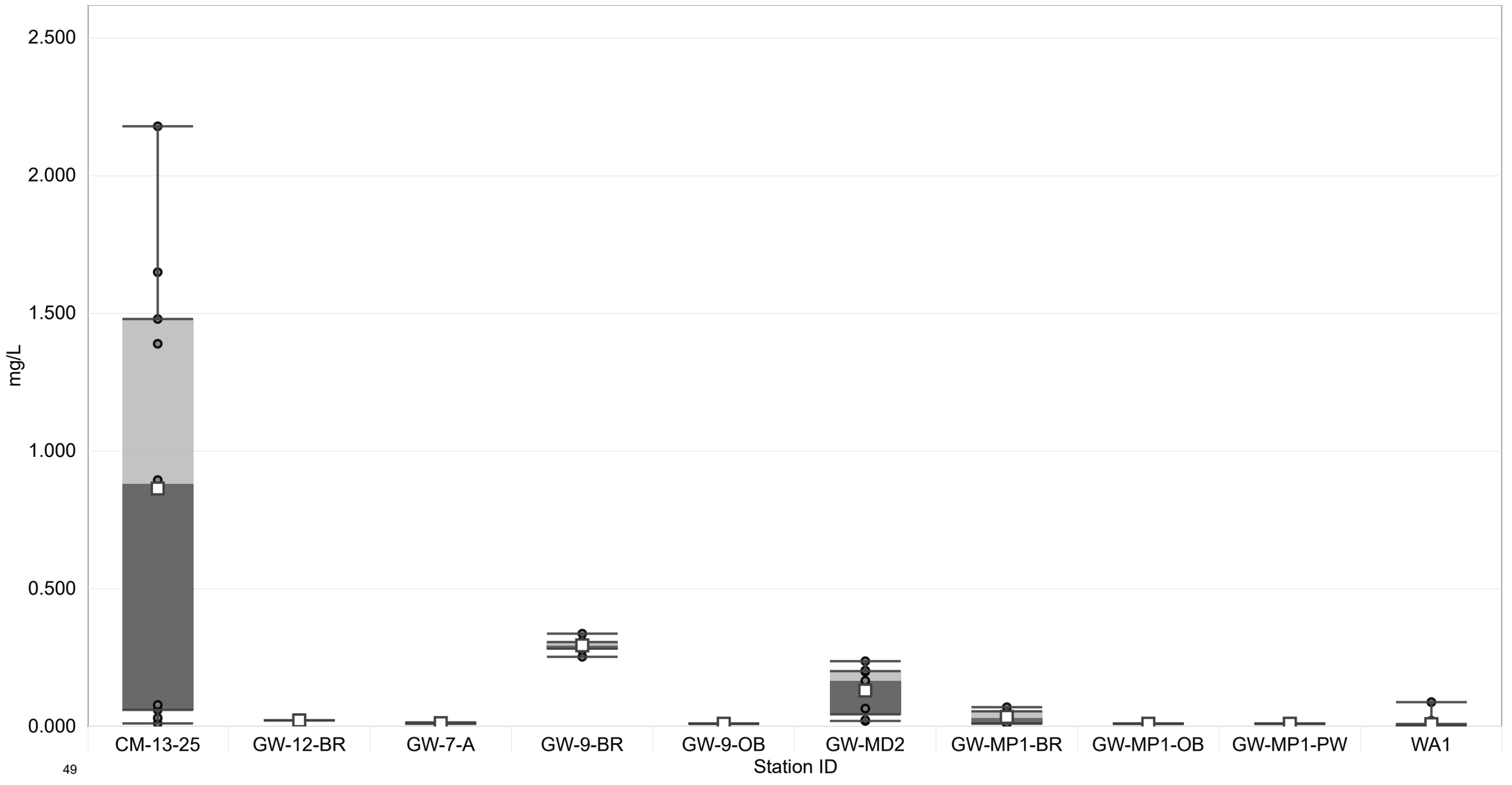
West Alexander Creek

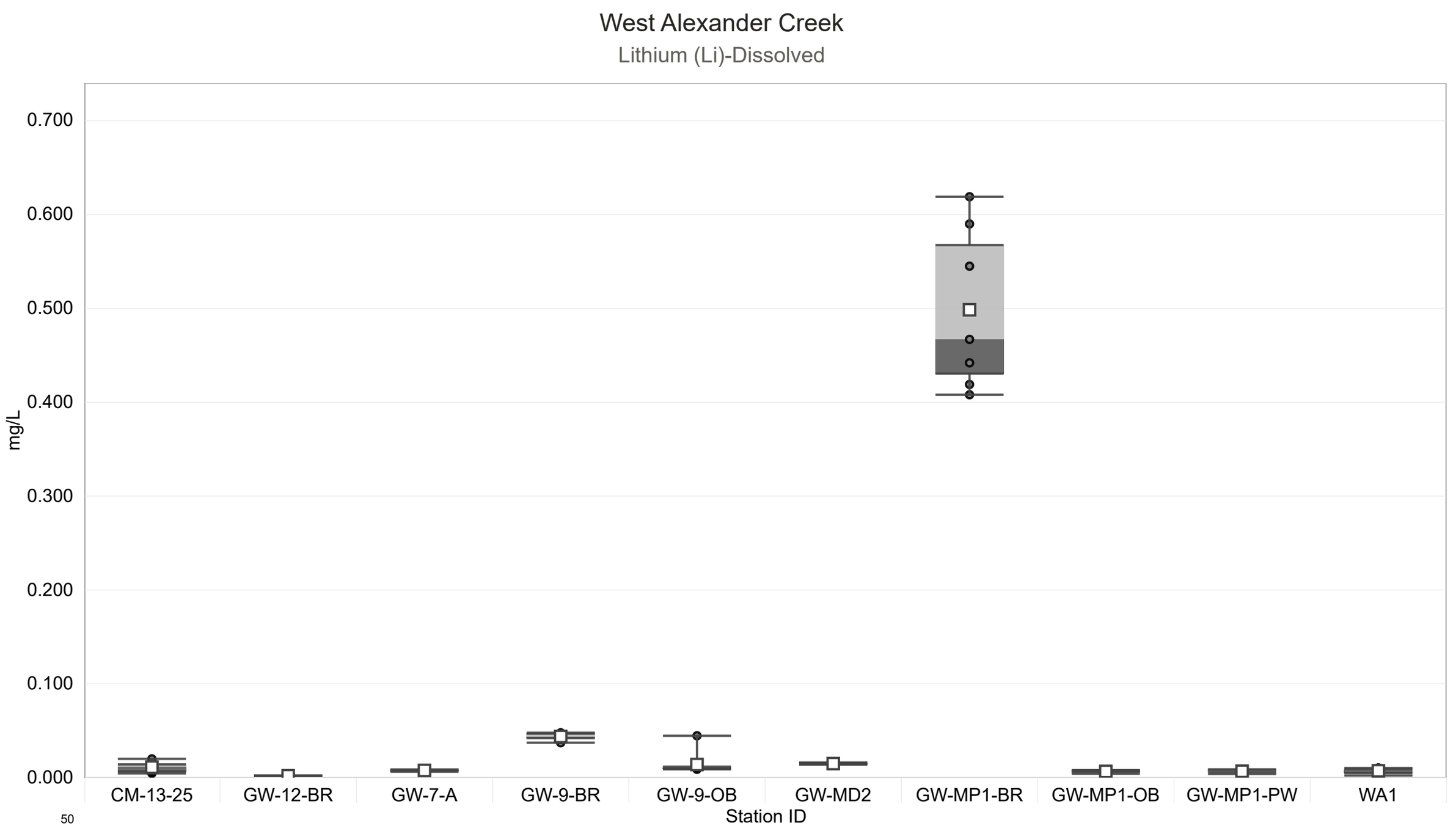
Sulphate (SO4)

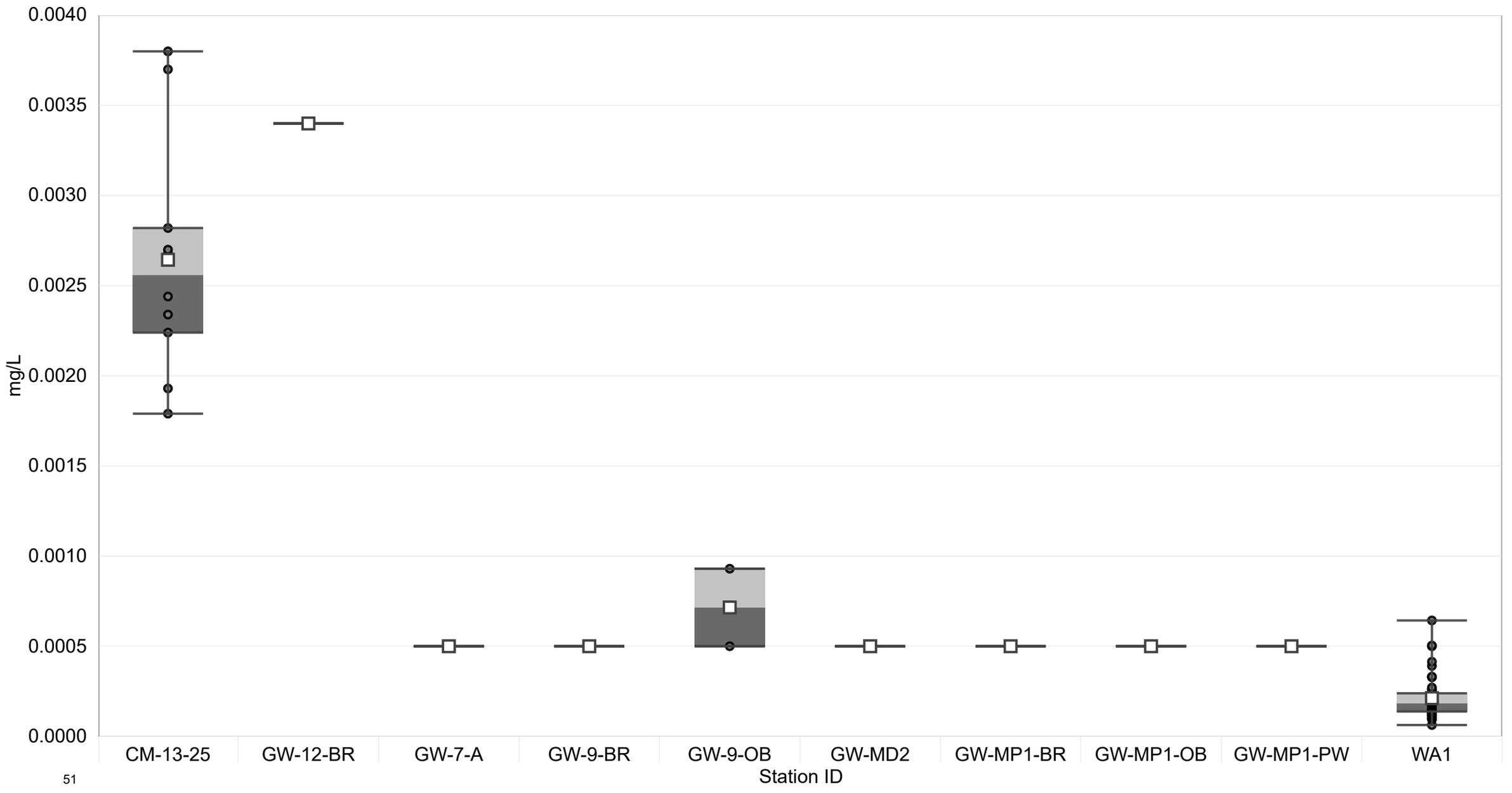


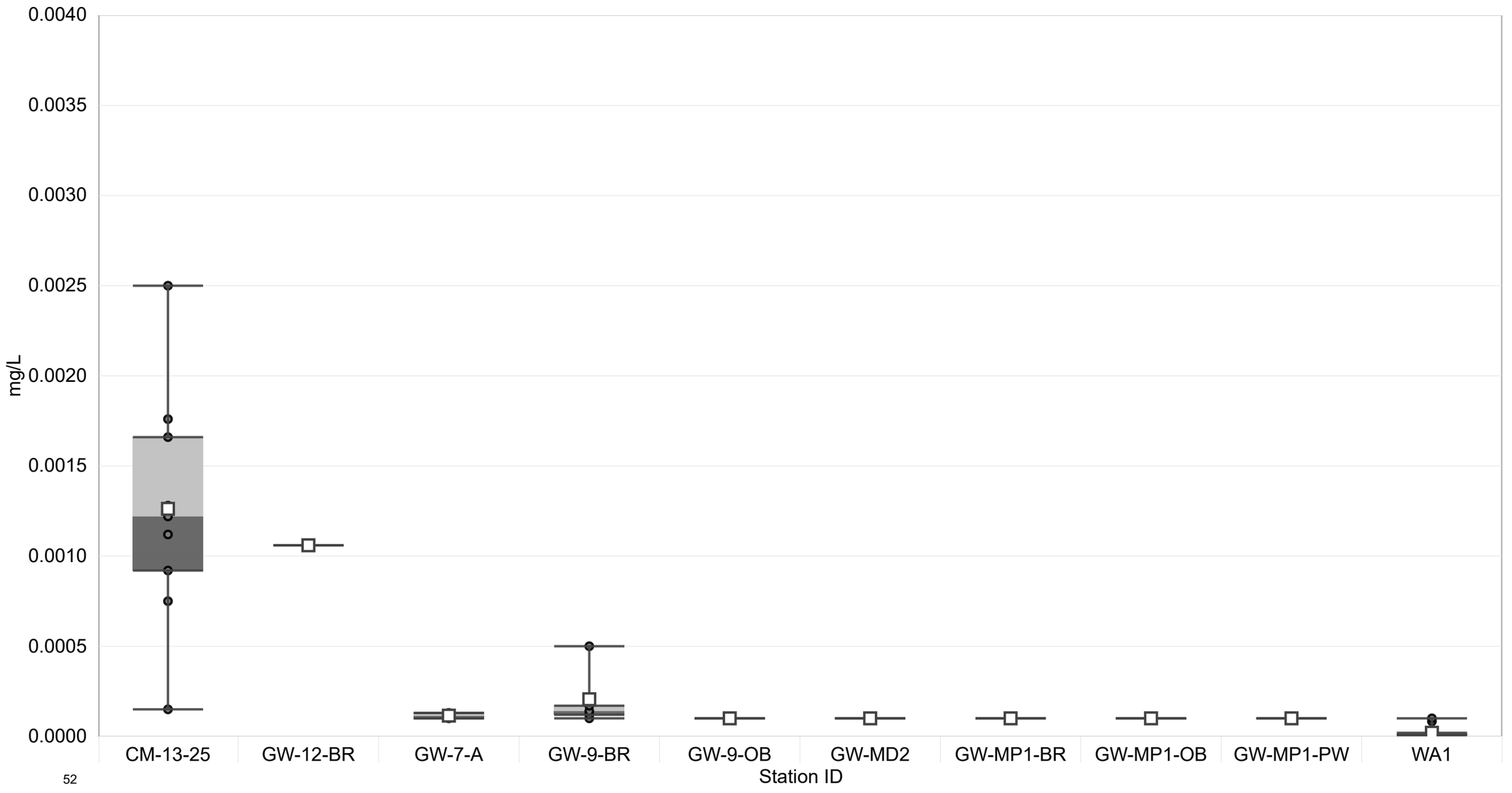

West Alexander Creek
Selenium (Se)-Dissolved
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
mg/L
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID


West Alexander Creek
Arsenic (As)-Dissolved
0.0020
0.0018
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
mg/L
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID


West Alexander Creek
Iron (Fe)-Dissolved
2.500
2.000
1.500
1.000
0.500
0.000
mg/L
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID

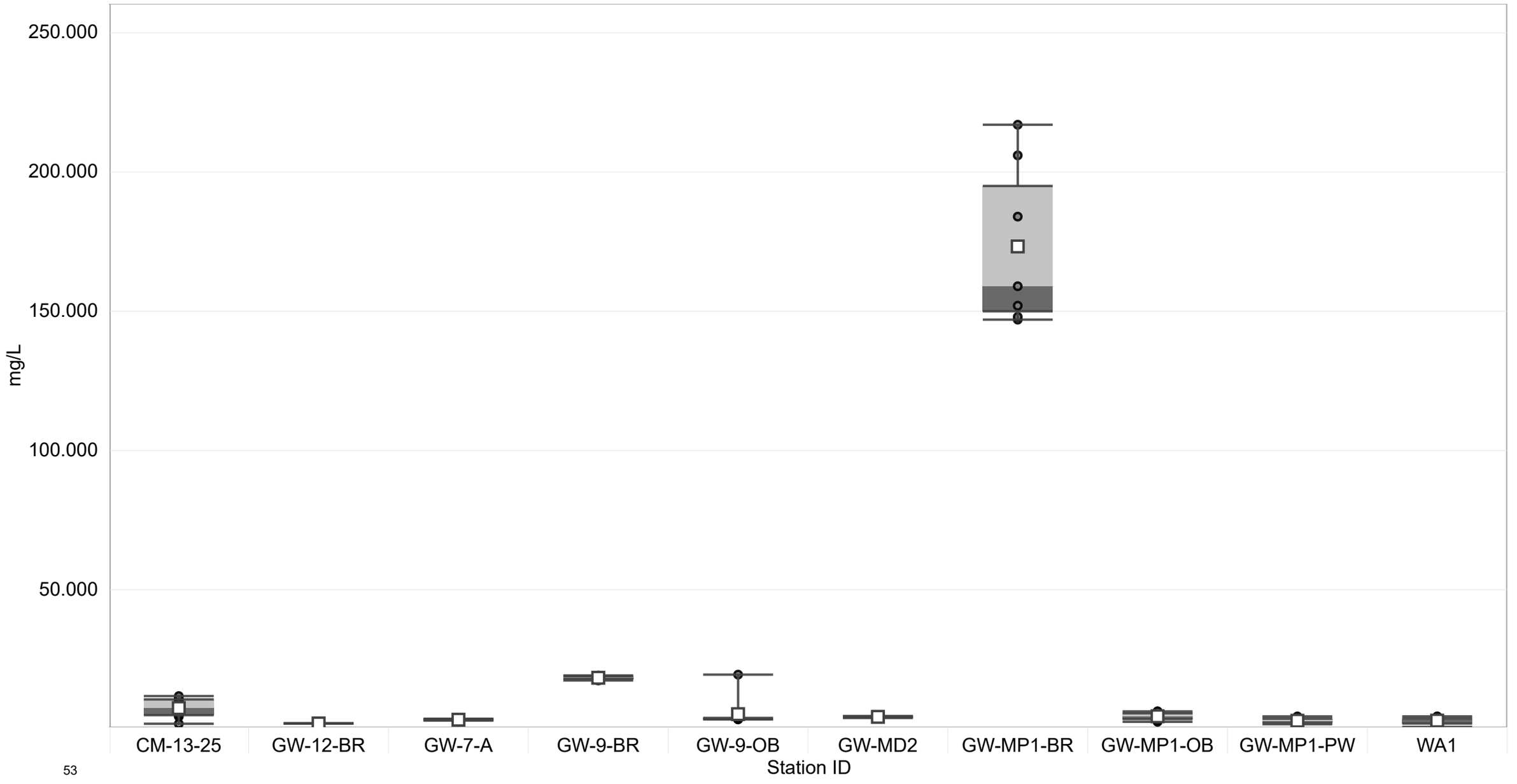

West Alexander Creek
Lithium (Li)-Dissolved
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
mg/L
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID

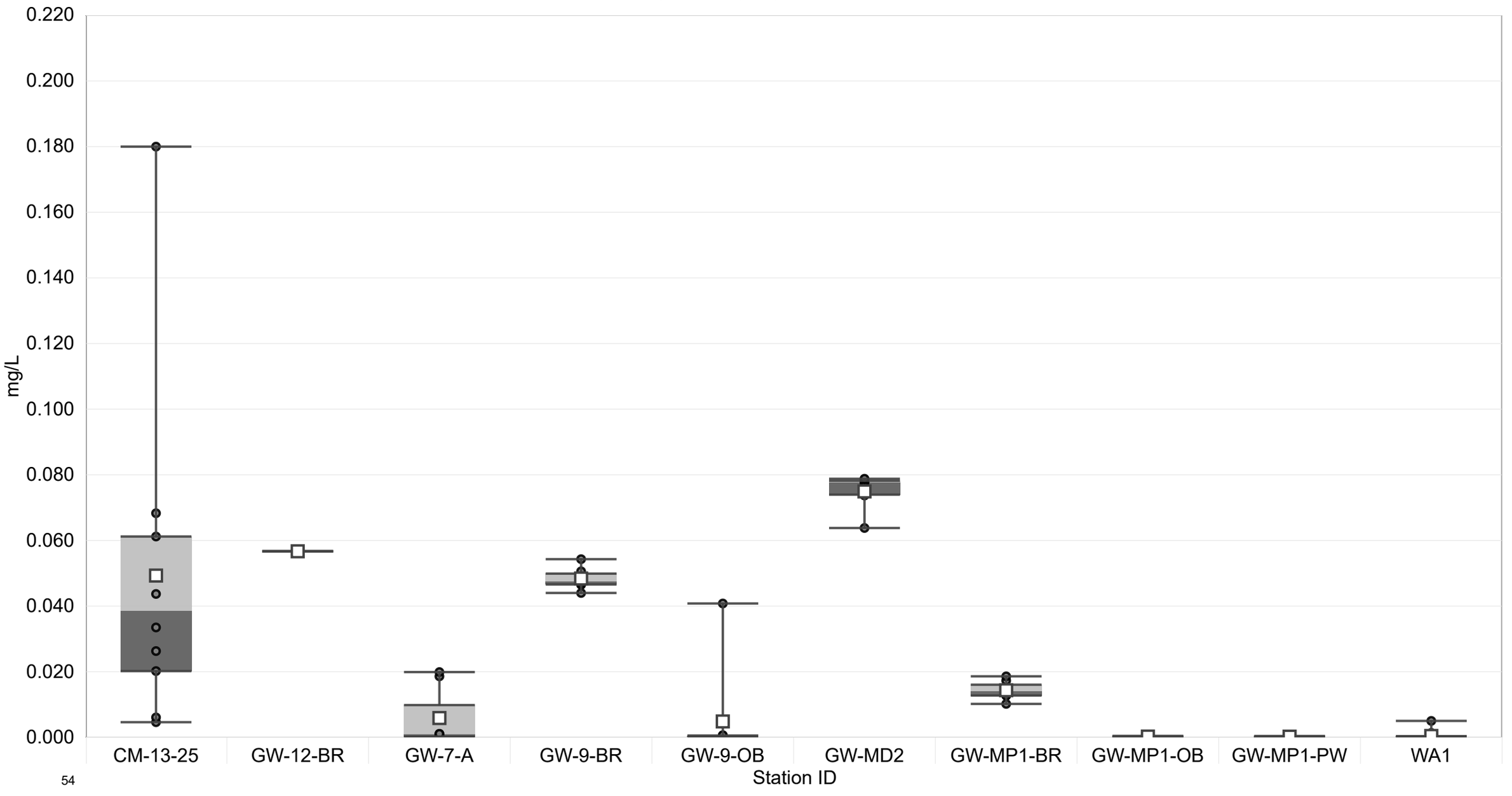

West Alexander Creek
Nickel (Ni)-Dissolved
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
mg/L
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID


West Alexander Creek
Cobalt (Co)-Dissolved
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
mg/L
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID

West Alexander Creek

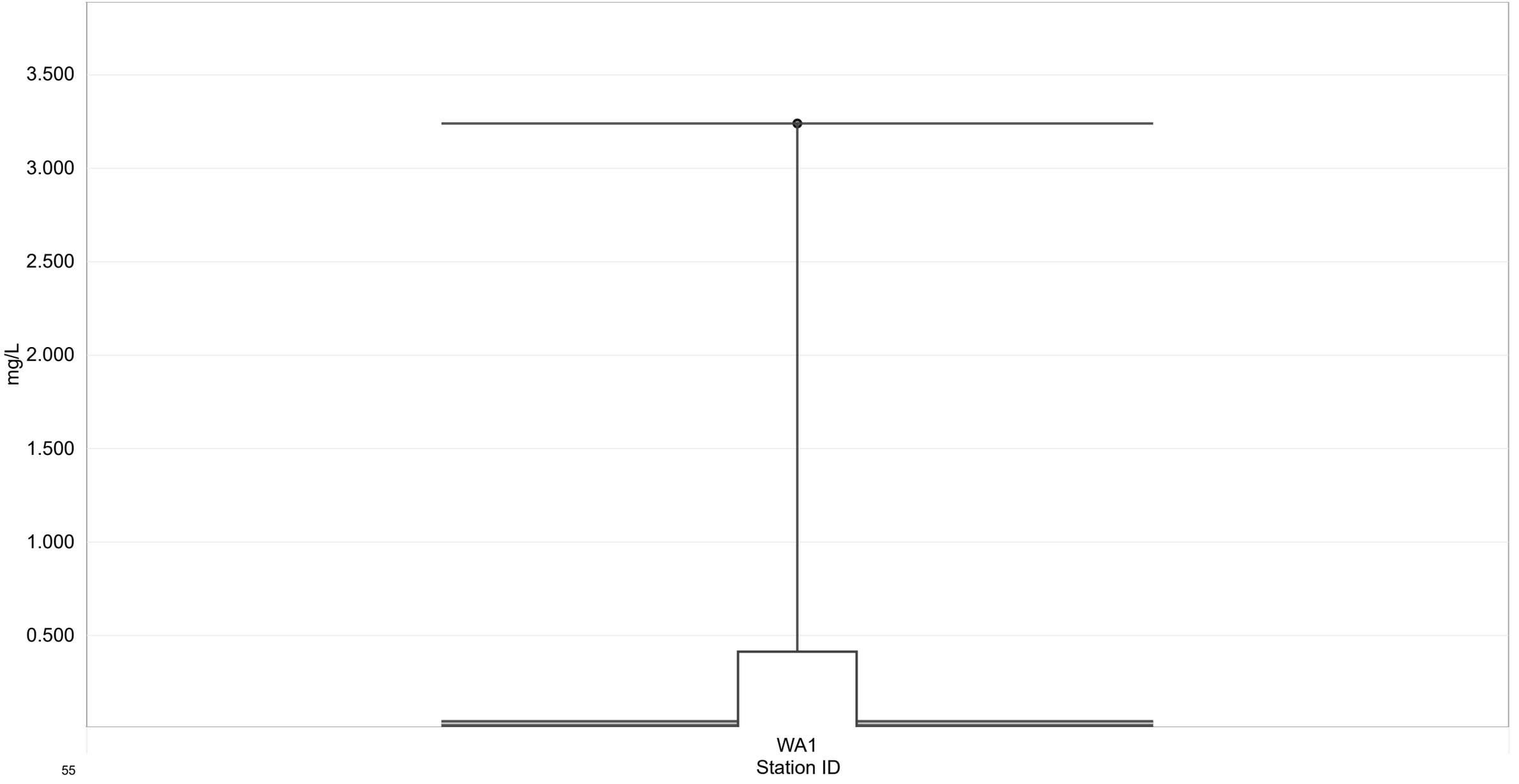
Sodium (Na)-Dissolved

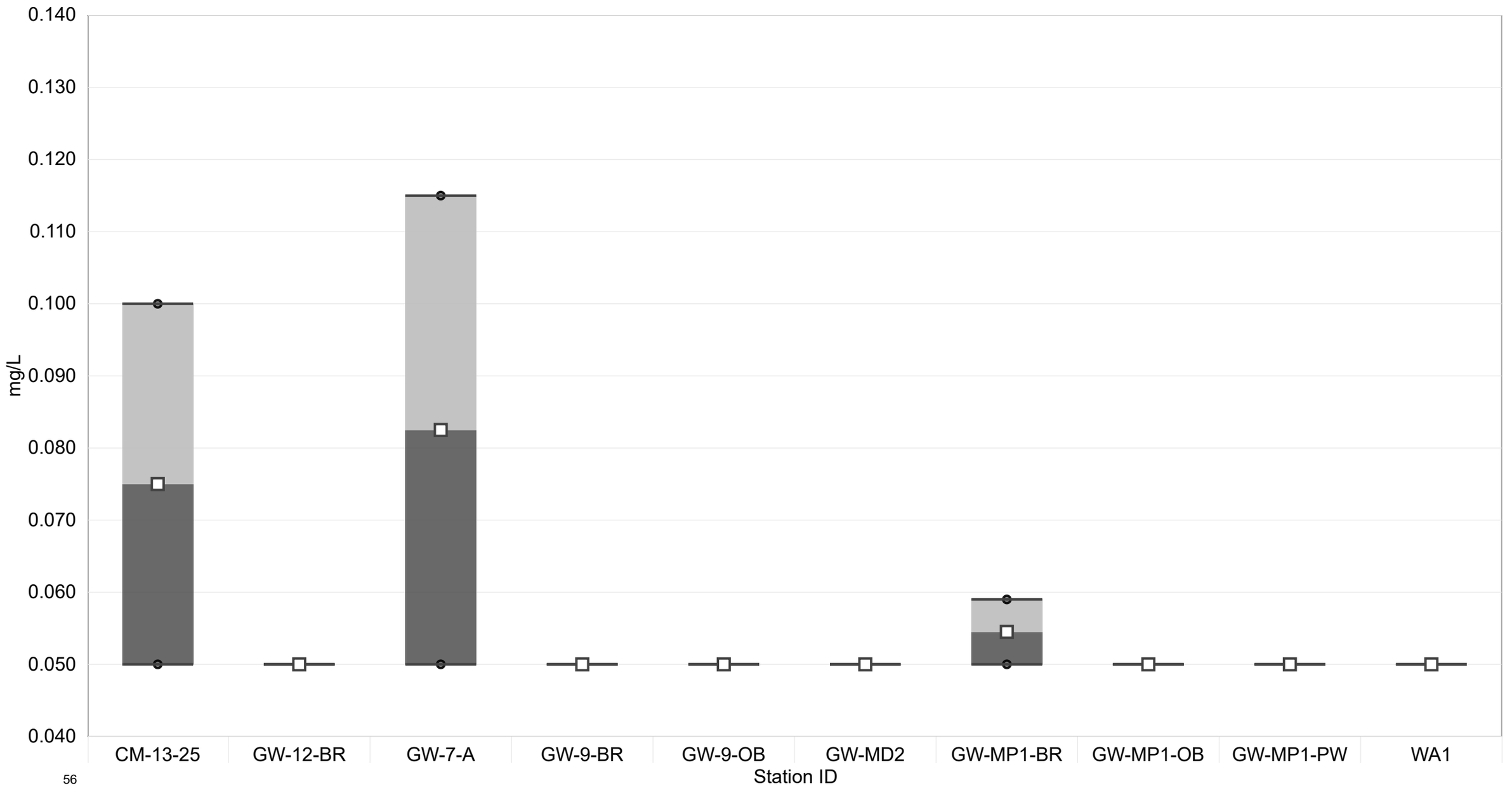



West Alexander Creek
Manganese (Mn)-Dissolved
0.220
0.200
0.180
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
mg/L
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID

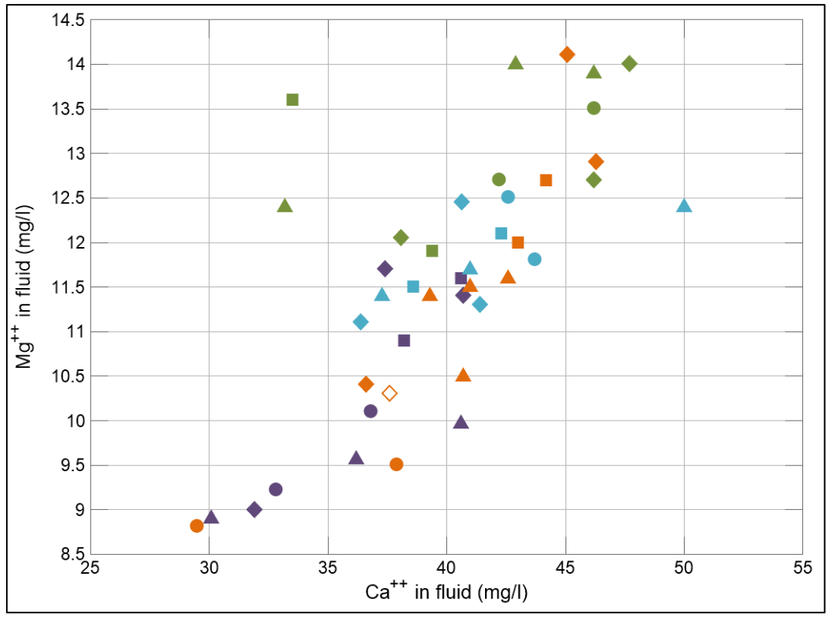
West Alexander Creek

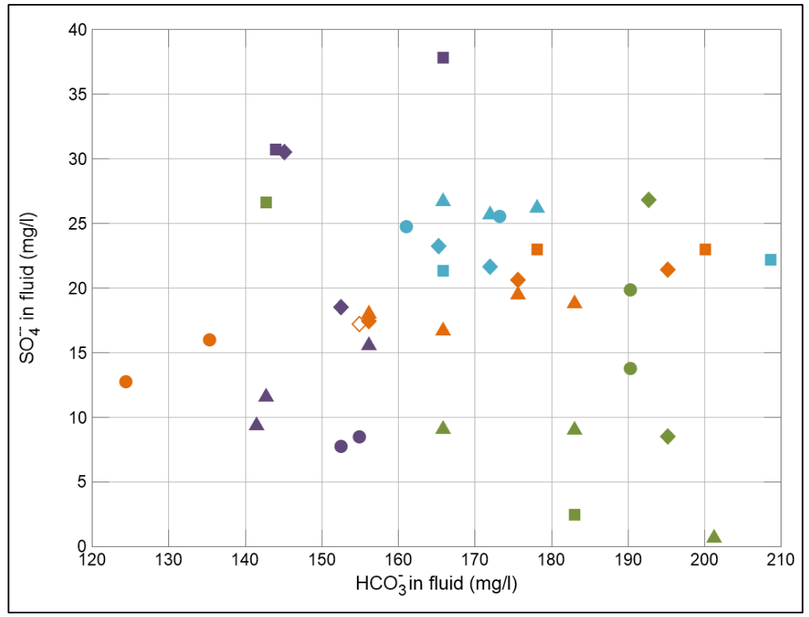
Phosphorus




West Alexander Creek
Phosphorus (P)-Dissolved
0.140
0.130
0.120
0.110
0.100
0.090
0.080
0.070
0.060
0.050
0.040
mg/L
CM-13-25
GW-12-BR
GW-7-A
GW-9-BR
GW-9-OB
GW-MD2
GW-MP1-BR
GW-MP1-OB
GW-MP1-PW
WA1
Station ID

Attachment 5 Cross Plots and Piper Diagrams

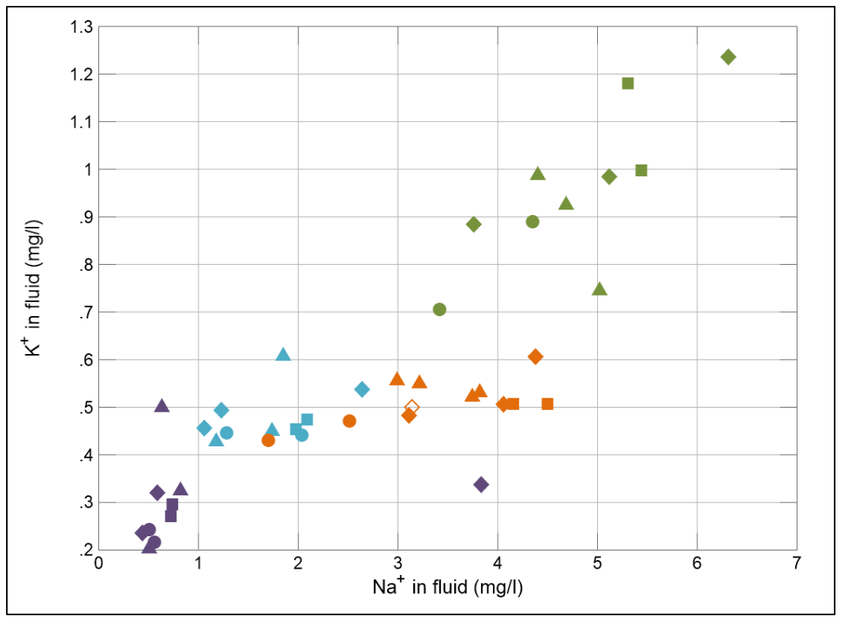


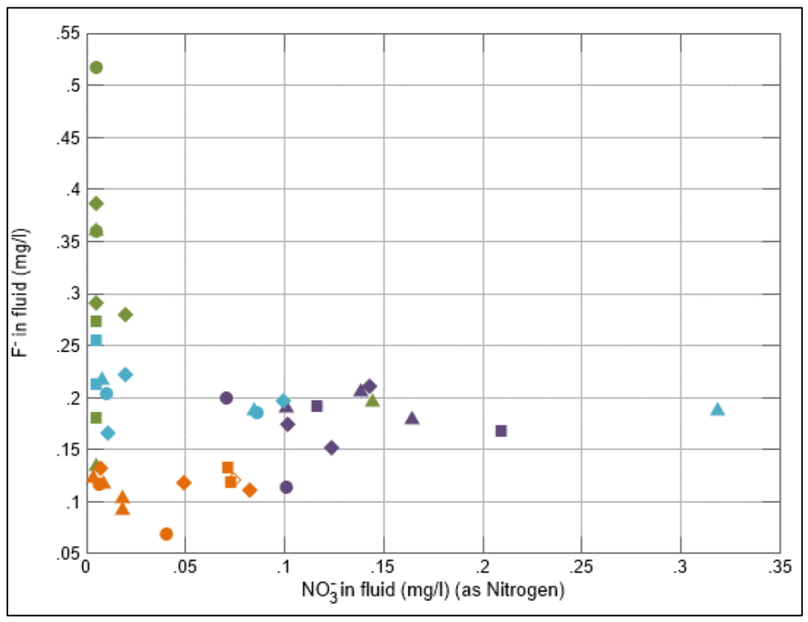


Legend

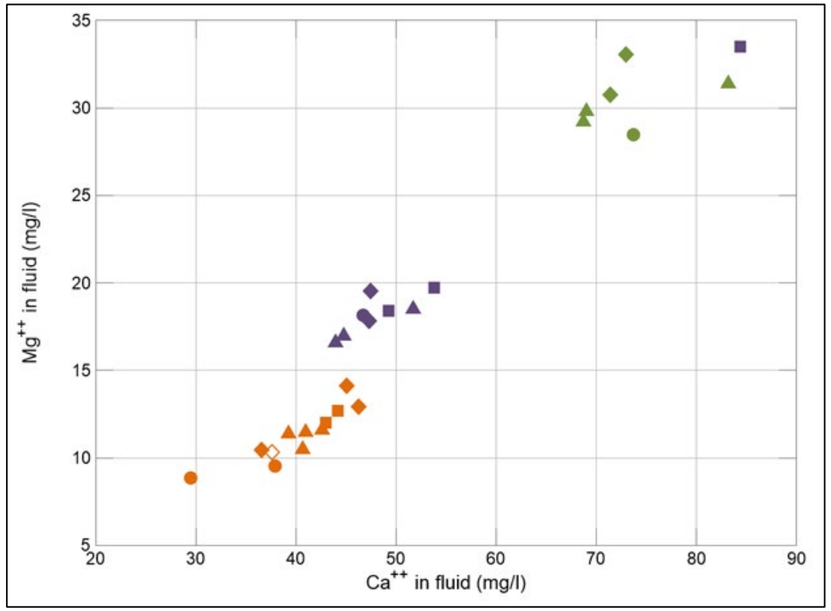
- WA1
- A3
- GW-3-A
- GW-3-B
- GW-3-C
- Sampled in Jan, Feb, or Mar
- Sampled in Apr, May, or Jun
- Sampled in Jul, Aug, or Sep
- Sampled in Oct, Nov, or Dec

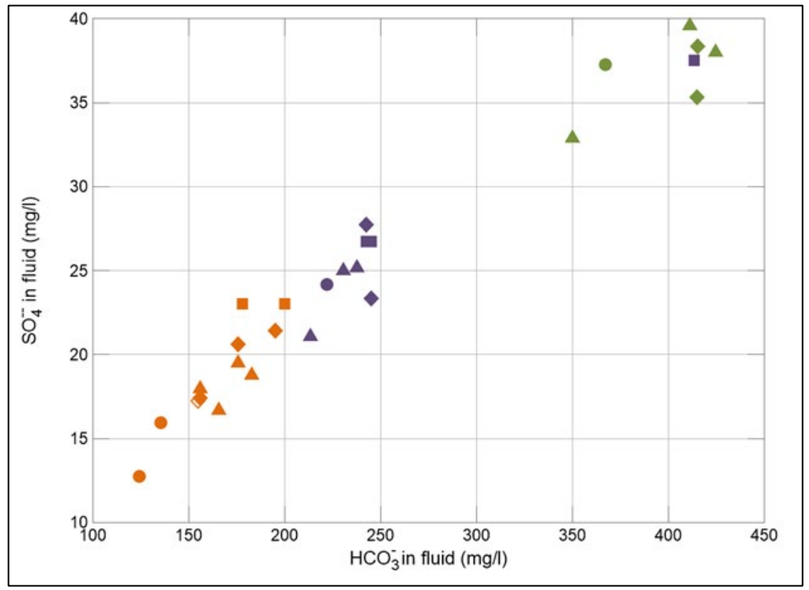
Note:
Only data from 2018 on is shown.
Bicarbonate (HCO_3^-) is mg/L as HCO_3^-.





srk consulting	NWP Coal Canada Ltd	Second Conformity Review
		Water Quality – Cross Plots
Job No: NA 393100.010 Filename: Figure 4-2_Geochem_Cross_Plots.pptx	Crown Mountain	Date: June 2023 / Approved: MS / Figure: 1

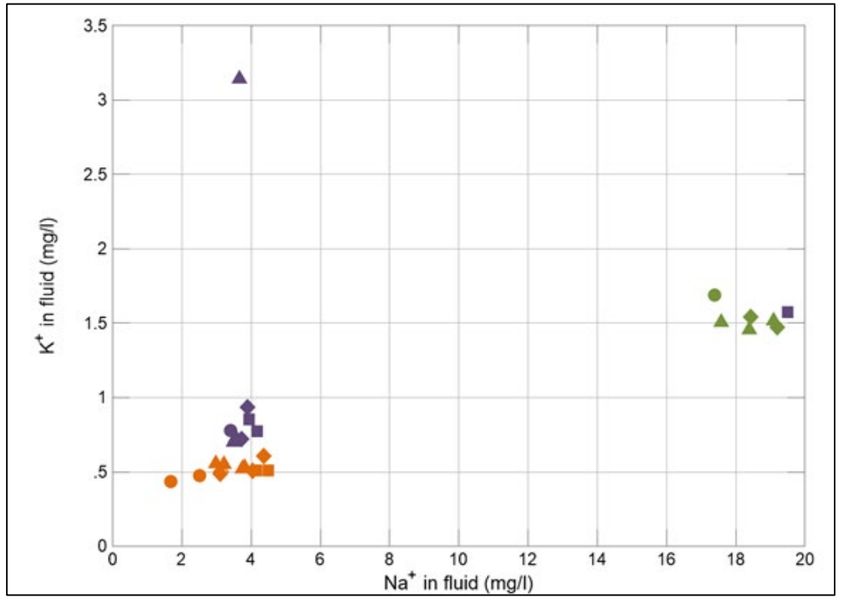


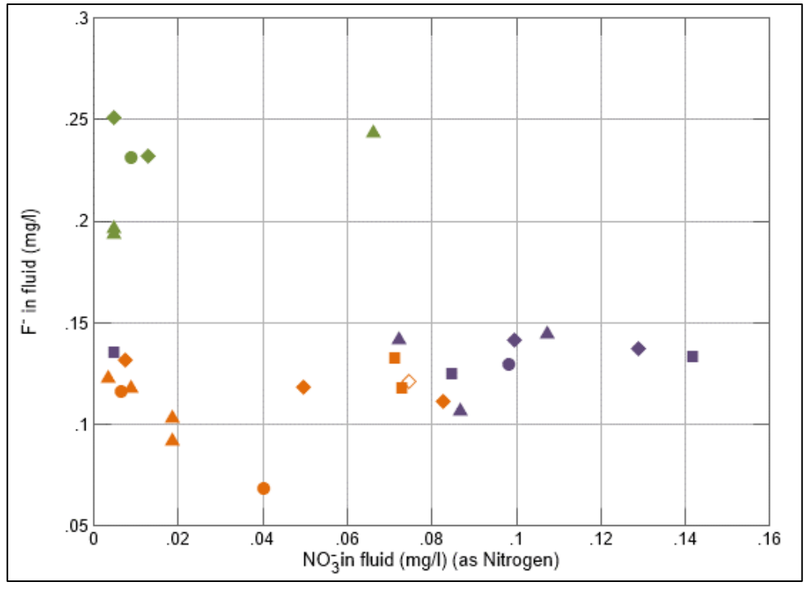


Legend

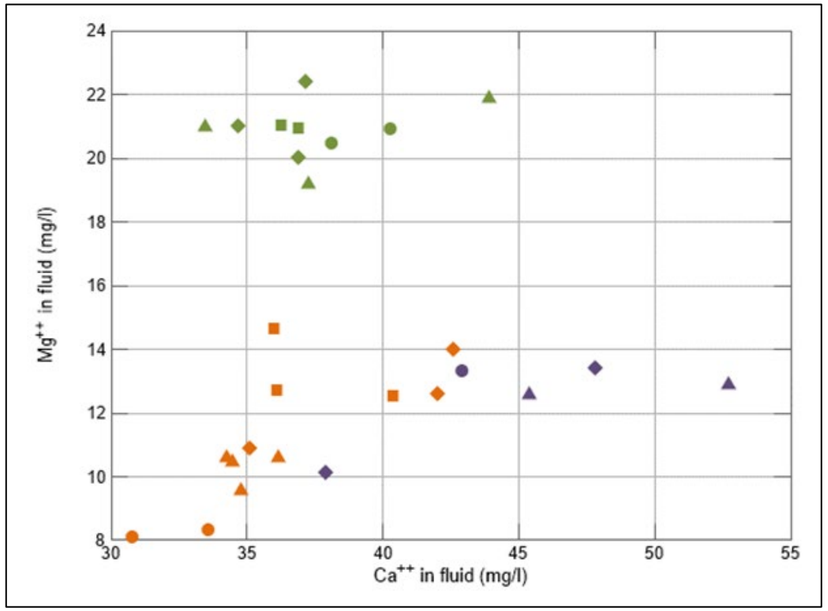
- WA1
- A3
- GW-9-BR
- GW-9-OB
- Sampled in Jan, Feb, or Mar
- Sampled in Apr, May, or Jun
- Sampled in Jul, Aug, or Sep
- Sampled in Oct, Nov, or Dec

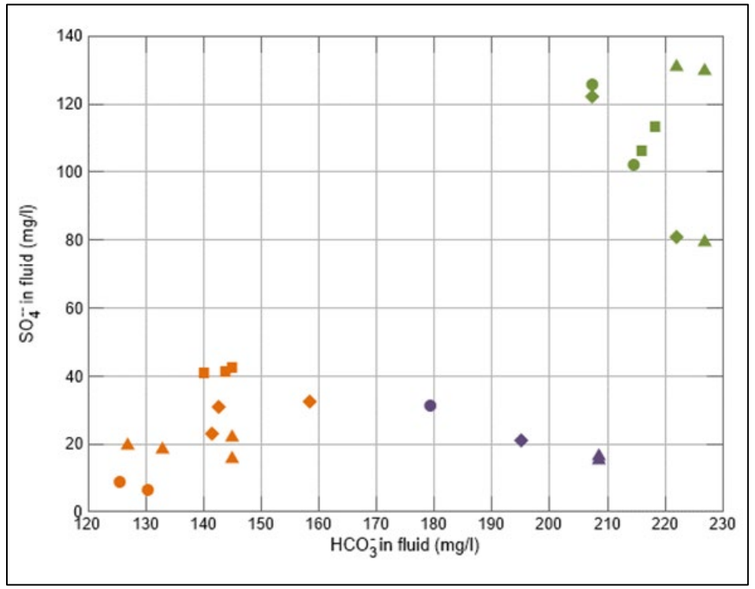
Note:
Only data from 2018 on is shown.
Bicarbonate (HCO_3^-) is mg/L as HCO_3^-.





srk consulting	NWP Coal Canada Ltd	Second Conformity Review	
Job No: NA 393100.010 Filename: Figure 4-2_Geochem_Cross_Plots.pptx	Crown Mountain	Water Quality – Cross Plots	
		Date: June 2023	Approved: MS / Figure: 2

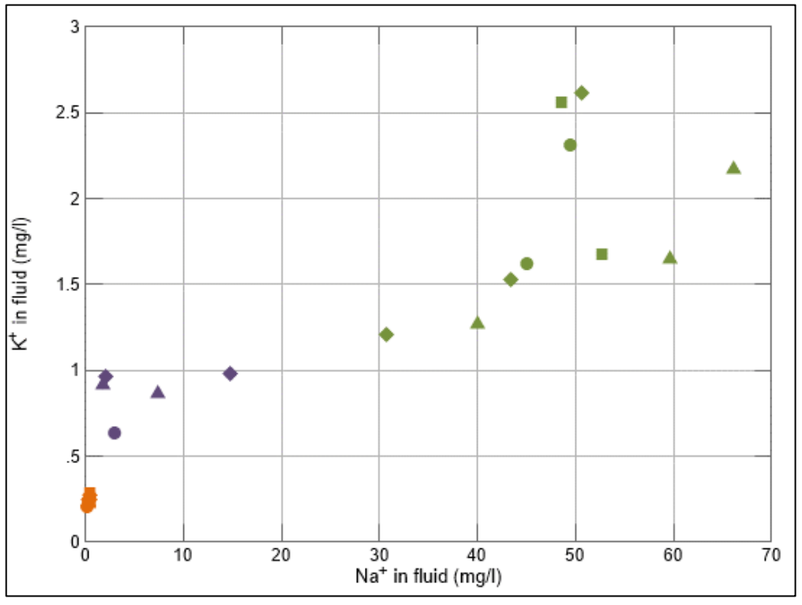


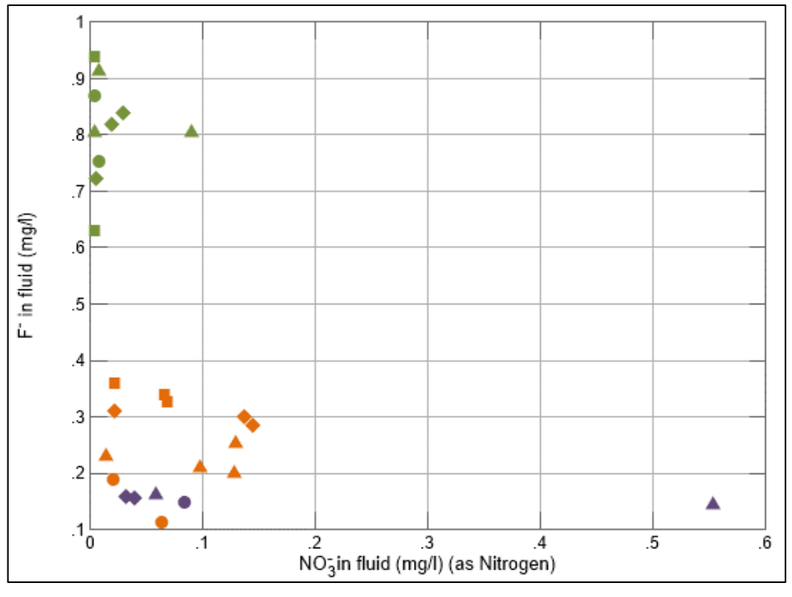


Legend

- A4
- GW-4-BR
- GW-4-OB
- Sampled in Jan, Feb, or Mar
- Sampled in Apr, May, or Jun
- Sampled in Jul, Aug, or Sep
- Sampled in Oct, Nov, or Dec

Note:
Only data from 2018 on is shown.
Bicarbonate (HCO_3^-) is mg/L as HCO_3^-.





srk consulting

NWP Coal Canada Ltd

Second Conformity Review

Water Quality – Cross Plots

Job No: NA 393100.010

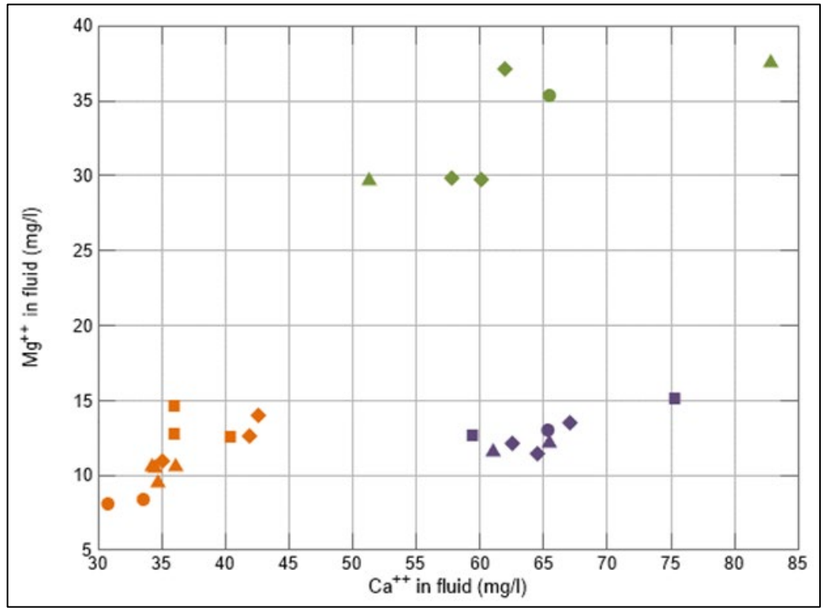
Filename: Figure 4-2_Geochem_Cross_Plots.pptx

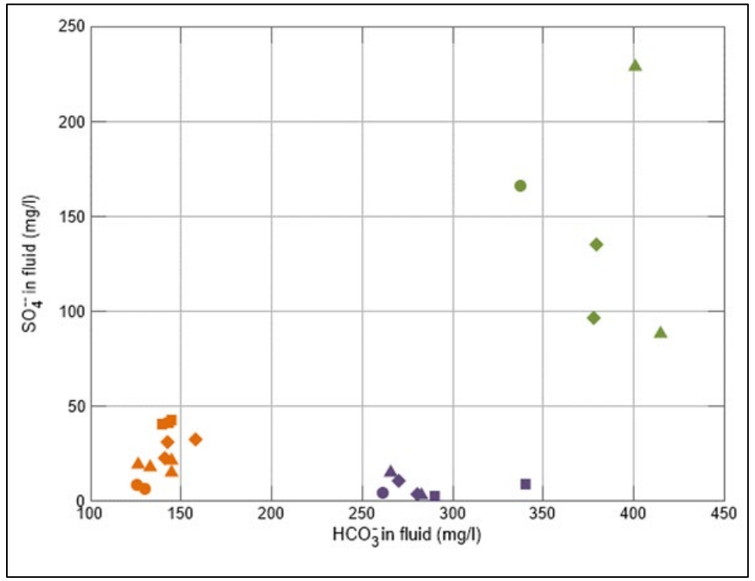
Crown Mountain

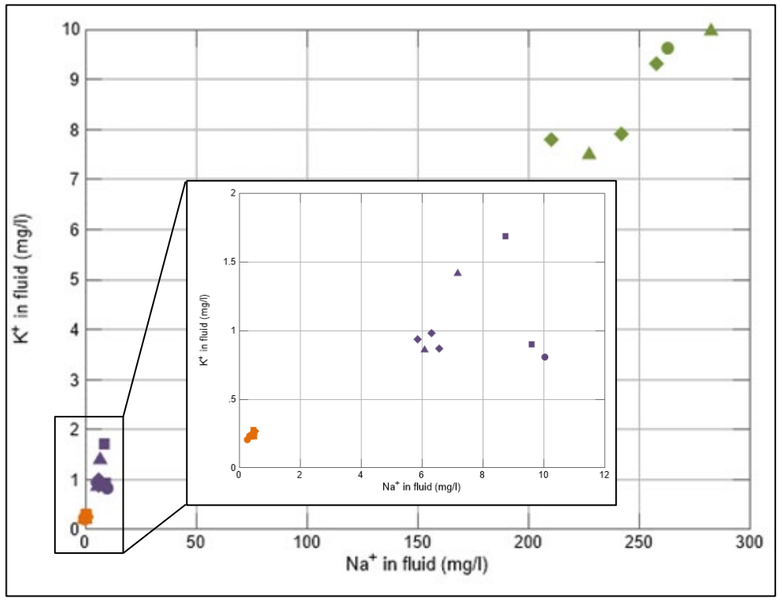
Date: June 2023

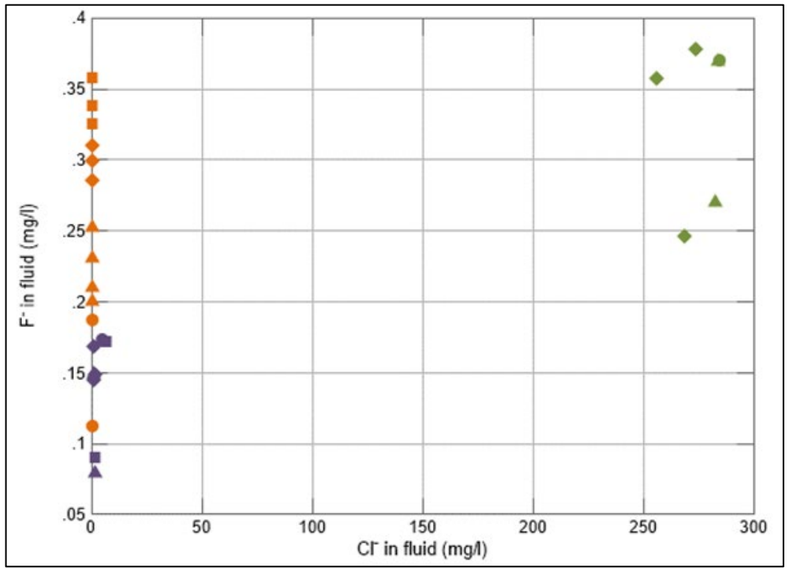
Approved: MS

Figure: 3







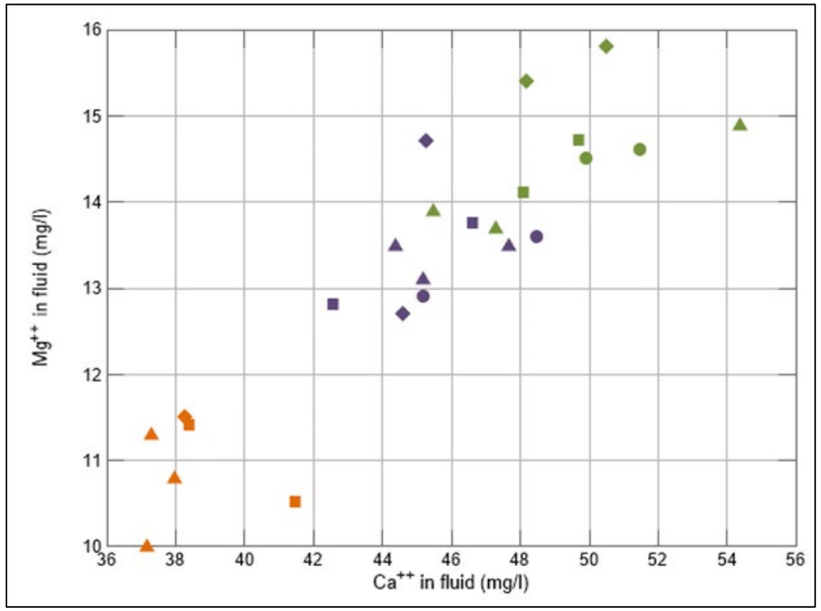


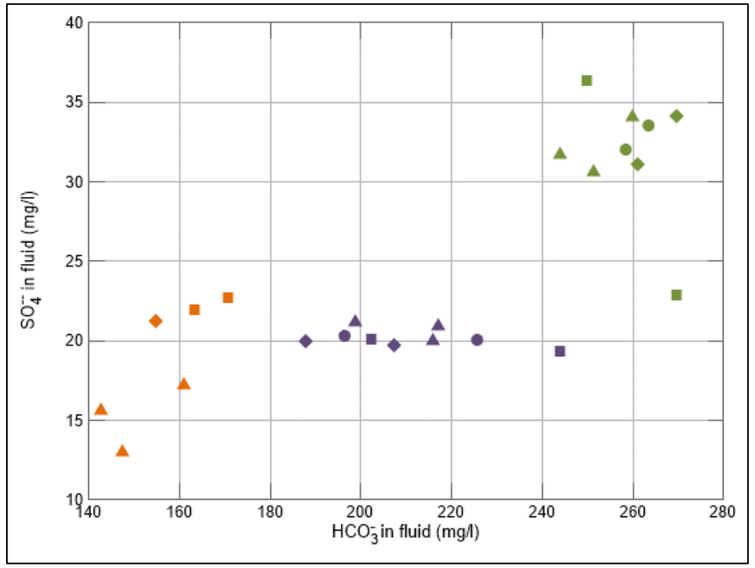
Legend

- A4
- GW-6-BR
- GW-6-OB
- Sampled in Jan, Feb, or Mar
- Sampled in Apr, May, or Jun
- Sampled in Jul, Aug, or Sep
- Sampled in Oct, Nov, or Dec

Note:
Only data from 2018 on is shown.
Bicarbonate (HCO_3^-) is mg/L as HCO_3^-.
Unlike previous plots, Chloride is plotted on the X axis of the bottom right graph (rather than nitrate).

srk consulting	NWP Coal Canada Ltd	Second Conformity Review
		Water Quality – Cross Plots
Job No: NA 393100.010 Filename: Figure 4-2_Geochem_Cross_Plots.pptx	Crown Mountain	Date: June 2023 / Approved: MS / Figure: 4

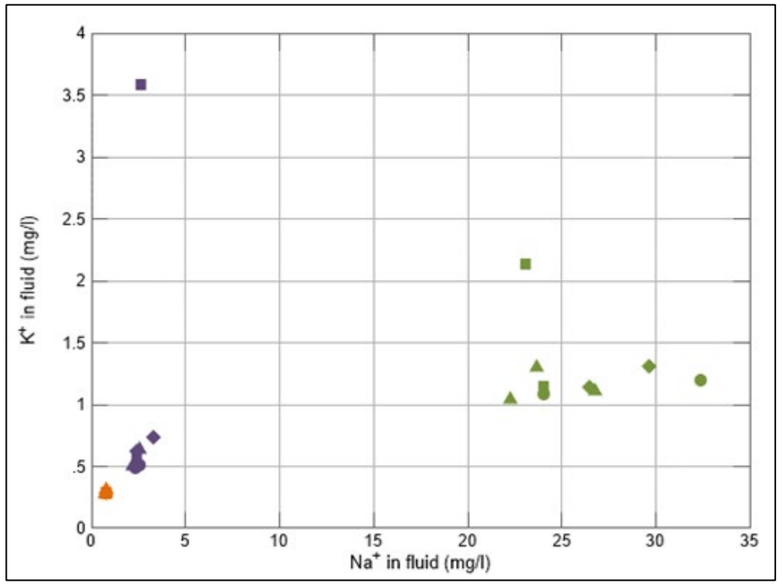


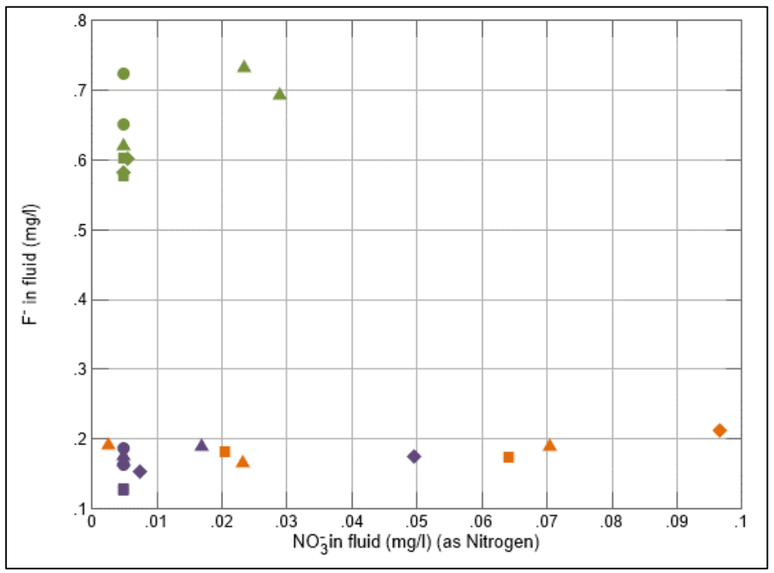


Legend

- A3(B)
- GW-1-A
- GW-1-B
- Sampled in Jan, Feb, or Mar
- Sampled in Apr, May, or Jun
- Sampled in Jul, Aug, or Sep
- Sampled in Oct, Nov, or Dec

Note:
Only data from 2018 on is shown.
Bicarbonate (HCO_3^-) is mg/L as HCO_3^-.





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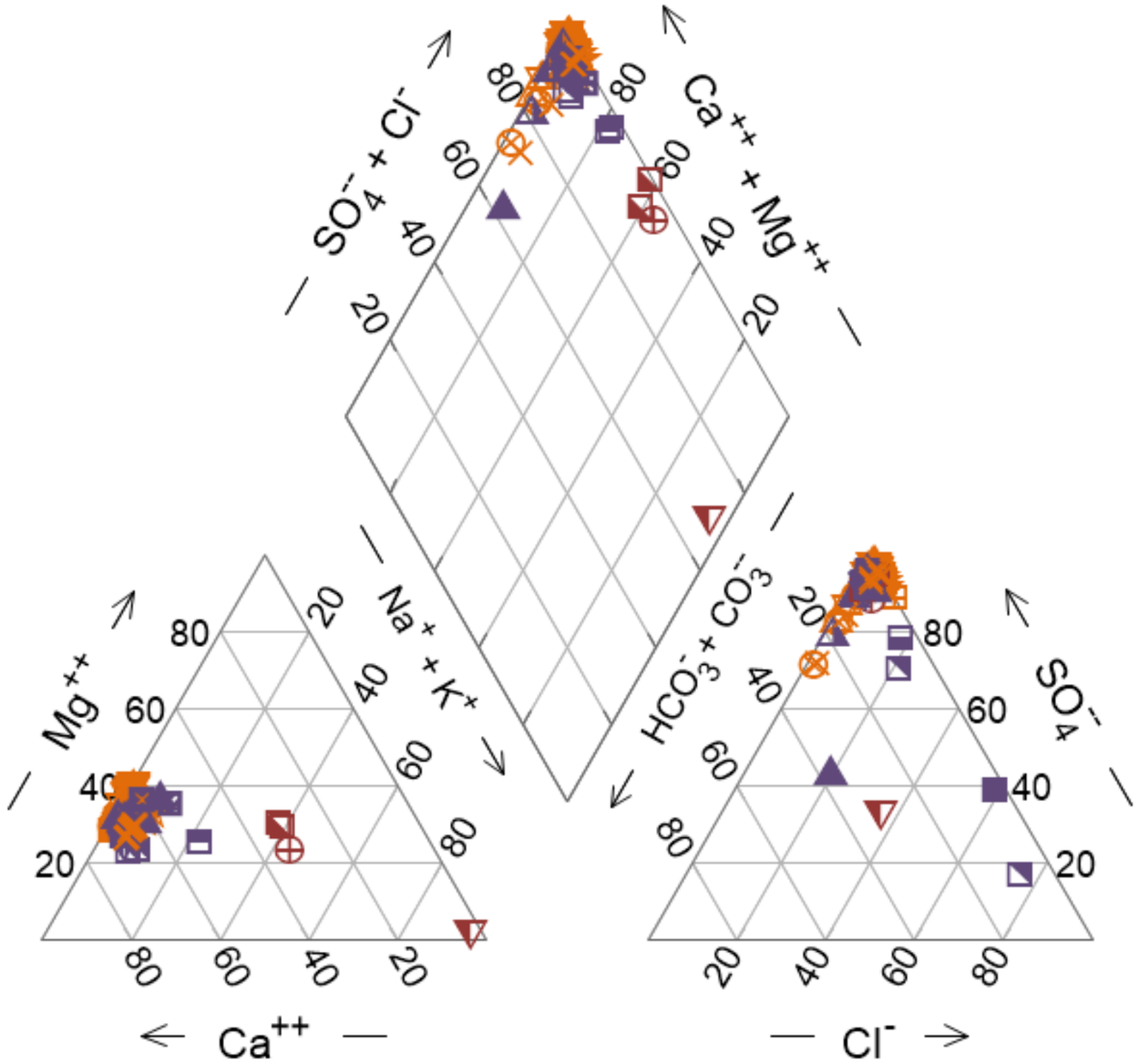
		Water Quality – Cross Plots
Job No: NA 393100.010 Filename: Figure 4-2_Geochem_Cross_Plots.pptx	Crown Mountain	Date: June 2023 / Approved: MS / Figure: 5

Q1: January to March



- A2
- A3
- A3(B)
- A4
- A5
- CM–11–11
- G1
- G2
- GW–1-A
- GW–1-B
- GW–3-A
- GW–3-B
- GW–3-C
- GW–4-BR
- GW–6-OB
- GW–7-A
- GW–9-OB
- GW-MP1-BR
- GW-MP1-OB
- GW-MP1-PW
- WA1

- Surface water
- Groundwater – Overburden
- Groundwater – Bedrock
- Groundwater – Overburden/Bedrock

% meq/kg

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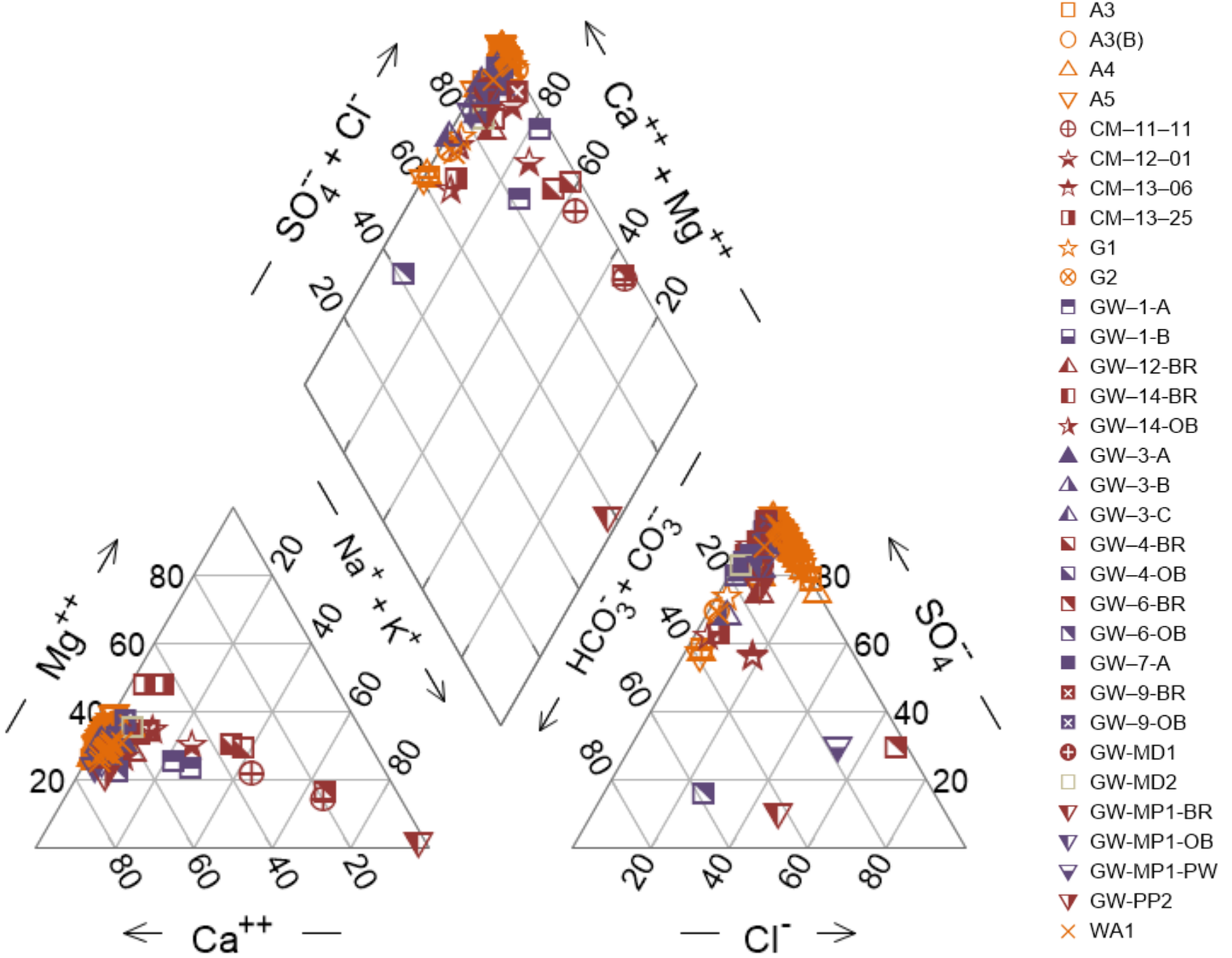
		Q1 Piper Plot
Job No: NA 393100.010 Filename: PiperPlots.pptx	Crown Mountain	Date: July 2023 / Approved: DM / Figure: 6

Q2: April to June



- A2
- A3
- A3(B)
- A4
- A5
- CM–11–11
- CM–12–01
- CM–13–06
- CM–13–25
- G1
- G2
- GW–1-A
- GW–1-B
- GW–12-BR
- GW–14-BR
- GW–14-OB
- GW–3-A
- GW–3-B
- GW–3-C
- GW–4-BR
- GW–4-OB
- GW–6-BR
- GW–6-OB
- GW–7-A
- GW–9-BR
- GW–9-OB
- GW-MD1
- GW-MD2
- GW-MP1-BR
- GW-MP1-OB
- GW-MP1-PW
- GW-PP2
- WA1

- Surface water
- Groundwater – Overburden
- Groundwater – Bedrock
- Groundwater – Overburden/Bedrock

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Second Conformity Review

Q2 Piper Plot

Job No: NA 393100.010

Filename: PiperPlots.pptx

Crown Mountain

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Approved: DM

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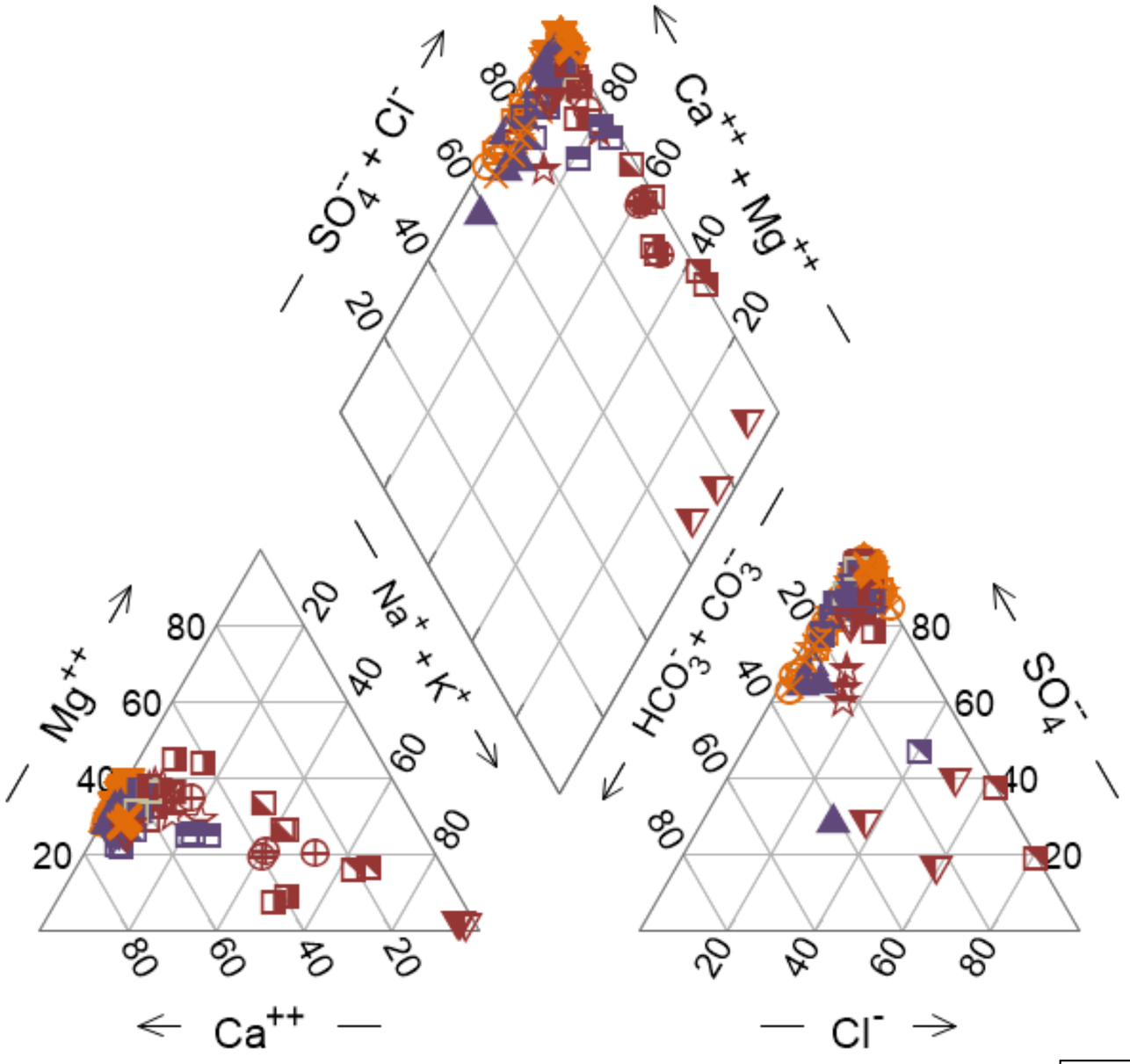
Q3: July to September



- A2
- A3
- A3(B)
- A4
- A5
- CM–11–11
- CM–12–01
- CM–13–06
- CM–13–25
- G1
- G2
- GW–1-A
- GW–1-B
- GW–14-BR
- GW–14-OB
- GW–3-A
- GW–3-B
- GW–3-C
- GW–4-BR
- GW–4-OB
- GW–6-BR
- GW–6-OB
- GW–7-A
- GW–9-BR
- GW–9-OB
- GW-MD2
- GW-MP1-BR
- GW-MP1-OB
- GW-MP1-PW
- GW-PP2
- WA1

- Surface water
- Groundwater – Overburden
- Groundwater – Bedrock
- Groundwater – Overburden/Bedrock

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Q3 Piper Plot

Job No: NA 393100.010

Filename: PiperPlots.pptx

Crown Mountain

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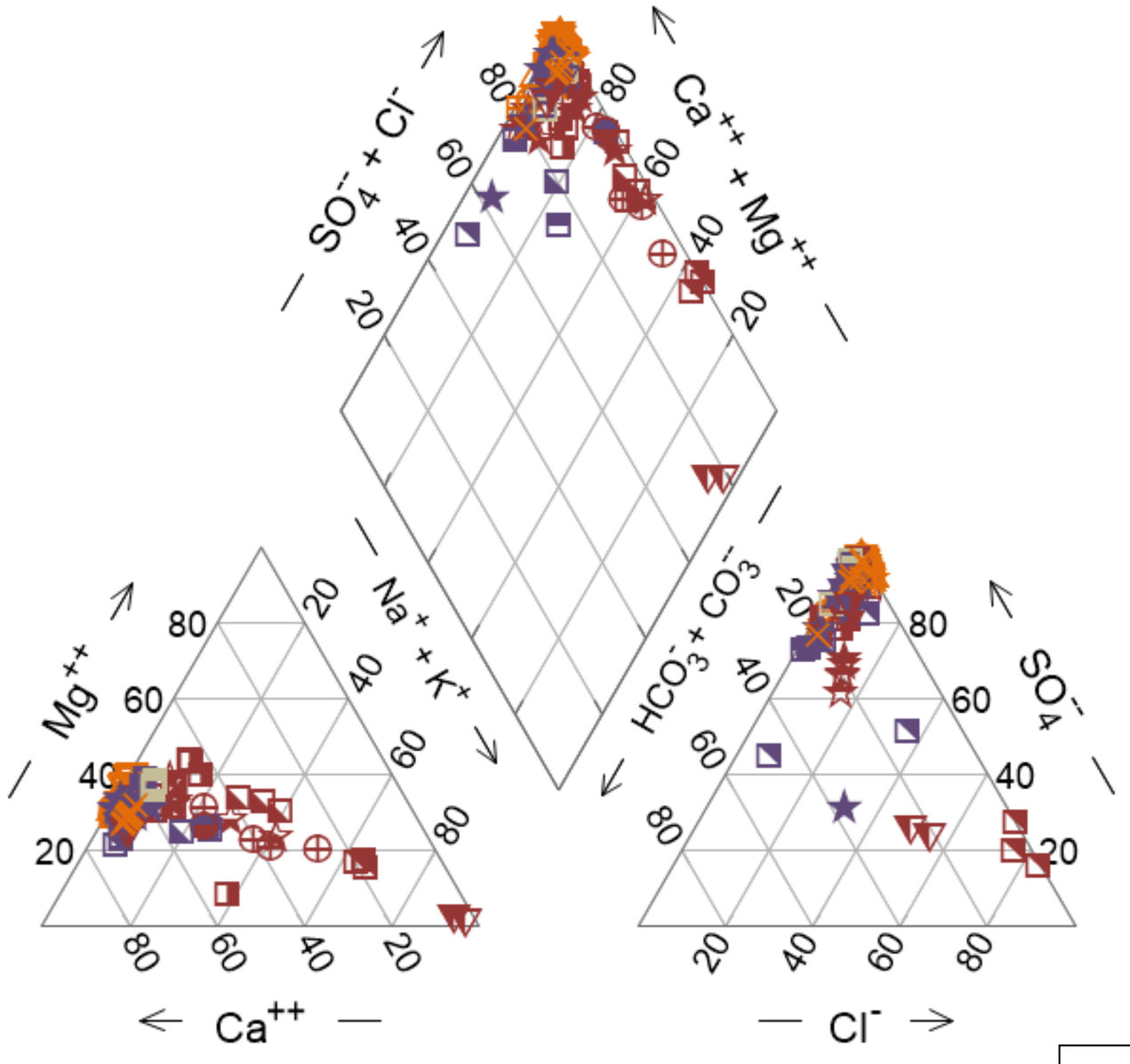
Q4: October to December



% meq/kg

- A2
- A3
- A3(B)
- A4
- A5
- CM–11–11
- CM–12–01
- CM–13–06
- CM–13–25
- G1
- G2
- GW–1-A
- GW–1-B
- GW–14-BR
- GW–14-OB
- GW–3-A
- GW–3-B
- GW–3-C
- GW–4-BR
- GW–4-OB
- GW–6-BR
- GW–6-OB
- GW–7-A
- GW–9-BR
- GW–9-OB
- GW-MD2
- GW-MP1-BR
- GW-MP1-OB
- GW-MP1-PW
- GW-PP2
- WA1

- Surface water
- Groundwater – Overburden
- Groundwater – Bedrock
- Groundwater – Overburden/Bedrock

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Second Conformity Review

Q4 Piper Plot

Job No: NA 393100.010

Filename: PiperPlots.pptx

Crown Mountain

Date: July 2023

Approved: DM

Figure: 9