FINAL TECHNICAL REPORT

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PROJECT TITLE
Beneficial Use of Harvested Ponded Fly Ash and Landfilled FGD Materials for High-Volume Surface Mine Reclamation

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Executive Summary

The overall motivation of this project was to demonstrate at laboratory, bench-scale, and full-scale demonstration levels that (a) coal ash surface impoundments can go through closure by removal as per USEPA and state regulations so that the material can be used as is (other than draining free water using CCRs piles) in high-volume beneficial applications, (b) FGD material from closed out FGD facilities can be excavated and recompacted for coal mine reclamation, and (c) harvested CCRs can be beneficially utilized (providing a net environmental gain) in large-volumes for reclamation at abandoned coal mine sites across the US, especially in the Eastern and Midwest coal mining regions.

The objectives of this project were to:

1) promote the safe and cost-effective closure by removal of coal ash impoundments,
2) harvest landfilled FGD, and
3) promote the high-volume beneficial use of these harvested CCRs in the reclamation of abandoned surface coal mine sites across the eastern and midwestern coal mining regions of the United States.

The major tasks carried out for this project are summarized below:

1) **Conesville Full-Scale Demonstration Project:** About 2 million tons of harvested CCR materials from the closure by removal of an inactive fly ash pond and an adjacent old FGD landfill were used for the full-scale demonstration project to fully reclaim a nearby partially completed abandoned surface coal mine. Site monitoring for the project duration was carried out and results are discussed.
2) **Laboratory Testing:** Geotechnical and environmental testing of harvested ponded fly ash and landfilled FGD material at the former Conesville power plant were carried out. Completing the laboratory testing allowed for QA/QC for the full-scale site construction and informed the formulation of the risk analysis.
3) **Risk Analysis**: We developed a reliable computational model for fate and transport. We used these models and the rich set of monitored data for the Conesville site to analyze risks to human health and ecological risks associated with high-volume surface mine reclamation using harvested CCRs.
4) **GIS Siting Study:** A Geographic Information System (GIS) study was carried out for three states in the Eastern coal mining region and two states in the Midwest coal region. This effort provided site specific GIS information for five states and allowed us to establish protocols that other states can follow in implementing their own state specific GIS study.

Ground and surface water quality monitoring of the full-scale demonstration project site for four years indicates significant improvement of water quality at the site compared with baseline (pre-reclamation data) with some exceptions. None of the groundwater samples exceeded the drinking water standards of Ba, Cd, Cr, Cu, Hg, Pb, Se, and F, except for As. Groundwater samples collected from one well in the deep Clarion sandstone aquifer (MW-1408) reflected naturally occurring conditions. Comparably, MW-1407 also exceeded (0.011 mg/l) or was at the MCL threshold of 0.01 mg/l. Arsenic concentrations also spiked in Phase 3 West at MW-1507s with a corresponding increase in Fe concentrations despite the decreasing trends in TDS and other major indicator parameters.

Data collected indicated that the deep aquifer underlying the area remained unaffected by the reclamation. The Clarion Sandstone aquifer continued to exhibit low total dissolved solids and lower concentrations of significant constituents, reflecting the fact that these monitoring wells were located close to the recharge area for this formation.

We did not identify any immediate risk to human receptors because of reclamation, but we did identify risks to aquatic life due to Boron in the surface water stream. Further research should determine any impacts of elevation trace elements in the perennial stream. The Boron may pose a risk to ecological systems and may be sourced from the CCRs placed in the abandoned mine land (AML), alterations in groundwater flow (unrelated to CCR use), or other site minerals present naturally.

The results of this GIS study, carried out in this project, demonstrate the potential for large-scale application of the research findings. This should inspire the audience with the impact of the study. The study supports the notion that harvested ponded fly ash and landfilled FGD materials can be beneficially utilized for high-volume surface mine reclamation based on geography. Each state, with its several coal-fired power plants (current or retired) with a landfill and / ash impoundment, could potentially benefit from this approach, addressing many abandoned mine land hazards. Assuming the engineering and logistics are feasible, the processes developed in this project could be applied to several power plants in each state analyzed. Furthermore, the nationwide applicability of this GIS Study offers inspiration for all states and regions with coal-fired power plants and abandoned coal mine land hazards.

Data collected from the monitoring network at the full-scale reclamation site will continue to be analyzed to assess the impacts of reclamation activities on the water quality of the nearby surface waters and underlying aquifers.

Additional isotope analysis of $\delta^{11}B$ and $^{87}Sr/^{86}Sr$ is needed to determine CCR leachate waters. We suggest supplementing water quality monitoring with isotopic analysis and biological monitoring of stream life.

Our model assumed that all hydrogeologic parameters remained constant. These included porosity, groundwater flow, permeability, isotropic hydraulic conductivity, and dispersity. These inputs were derived from technical reports of the site and sFGD characteristics. However, hydrogeologic parameters are often uncertain, and their impacts need further investigation.

Table of Contents

List of Figures

by Martin, October 2022). (c) An example of completed reclamation is the application of mine spoil cap and revegetation with grasses (hay laid to prevent erosion) (Photo taken in October 2022).

Figure 3-5. Cross section (A-A') depiction of Phase III East Reclamation (NTS). sFGD is placed within the AML pit to create a low-permeable seal with the other CCRs. Groundwater flows from A towards A'.

Figure 3-6. Conesville Phase III East Monitoring Locations. Contour lines show topographic elevations (m) above sea level with 15 m intervals. Phase III East is outlined in red. Shallow groundwater monitoring at MW-1405, MW-1705, and MW-1702 is shown, as well as seep and surface water sample locations Seep-2 and SW-04. The cross-section A-A' has a length of 500 m, 65 m which intersects with Phase III East. County Road 429 is in the southeastern part of the map.

Figure 3-7. Elemental content of sFGD (left) and percentage leached (right) of As, Se, and B from column experiments.

Figure 3-8. Human and Ecological Health Risk Calculated with Parametric Bootstrap Mean for sFGD. Violin plot of parametric bootstrap mean distribution of As, Se, and B from sFGD leachate. Violins denote the parametric bootstrap distribution of mean used in calculations of HQ, HQ_{aq}, exceedance of the MCL, and C_{risk}. Within the violins, the dashed line indicates the mean and dotted lines mark the upper and lower quantiles. The horizontal solid line at 1.0 represents the threshold above which risk is exceeded. HQ_{aq} shows the Parametric Bootstrap expected concentration normalized with the chronic AC values shown in Table 4. Exceedance of the drinking water standard is shown in the MCL column. The distributions are normalized for MCL values 0.01 mg/L and 0.05 mg/L for As and Se, respectively. The risk of cancer due to As is shown as increased likelihood of cancer in a population of 100,000 (US EPA 2023).

Figure 3-94. Column experimental data (filled dots) and observations below the MDL (open dots) for As, Se, and B each day, approximately equaling one L/S. These data are compared to the results of the BI shown by the violins. The BI results represent the model and data uncertainty. Each violin represents the posterior model error when provided with a prior Gaussian distribution. Negative distribution tails are an artifact of assuming the prior Gaussian distribution of the uncertainty.

Figure 3-10. Selected elemental concentrations from column experiments: Al, Fe, Ca, and Pb.

Figure 3-11. Phase 3 East water quality observations from shallow groundwater wells: MW-1405, MW-1705, and MW-1702; seep: SEEP-2; and surface water: SW-04. The gray horizontal band indicates the parametric bootstrap mean concentration +/- one standard deviation of As, Se, and B from the column and SPLP experimental results. The site model of MW-1702 is shown by the solid green line, with the five calibrated parameters equal to the posterior estimates and $\boldsymbol{V_{fSe} = 1x10^{-9}}$ and $\boldsymbol{V_{fAs} = 6.07x10^{-9}}$. The green band shows the sensitivity of the model to the volume fraction parameter when $\boldsymbol{V_f \sim U(1x10^{-11}, 1x10^{-7})}$. The gray vertical line denoted the start of Phase 3 East reclamation in August 2016.

Figure 3-12. Results of column leaching experiments over days that approximately equaled 1 liquid to solid ratio (L/S). Filled dots indicate measurements above the MDL and open dots indicated measurements below the MDL.

Figure 3-13. SPLP results of three CCRS placed in Phase III East with associated MCL (red dot-dashed line) and chronic AC (green dashed line). These box plots indicate the mean, standard deviation, and outliers of the data above the MDL for the SPLP data results only. sFGD had 12 As, 6 Se, and 14 B measurements, FGDG had 6 As, 13 Se measurements, and 12 B measurements, and FA had 6 As, 13 Se, and 12 B measurements.

List of Tables

Chapter 1. Introduction

1.1 Motivation

Over the last two decades, the beneficial uses of CCRs (coal combustion residues) at abandoned coal-mined lands have been researched and documented. Extensive regulatory authority water quality monitoring data and university research data indicate that the placement of virgin CCR materials under the permitting and performance standard requirements at mine sites usually results in a positive impact on human health and the environment when used to mitigate pre-existing mining hazards (Stehouwer 1996; Wolfe et al, 2009; NRC, 2006). With the passage of the CCR regulations, greater emphasis has been placed on utilizing CCRs within mine reclamation practices to ensure that water quality is not impaired. However, no work had been done on ponded fly ash and harvested landfilled FGD materials for use in abandoned mine land (AML) reclamation. This project was carried out to address this technological gap.

1.2 Project Objectives

The objectives of this project were to

a) promote the safe and cost-effective closure by removal of coal ash impoundments,
b) harvest landfilled FGD, and
c) promote the high-volume beneficial use of these harvested coal combustion residues (CCRs) in the reclamation of abandoned surface coal mine sites across the eastern and midwestern coal mining regions of the United States.

This project focused on the viability of beneficial use of harvested CCRs, especially ponded fly ash and landfilled FGD by-products (stabilized sulfite FGD material and FGD gypsum), in the vicinity of coal ash pond facilities and FGD landfills.

1.3 Project Benefits

The project reduces by-product liability and disposal costs for coal-fired utilities in an economically viable manner that benefits the environment, the public's health and safety, and the generating companies.

This work provides two significant benefits. First, the use of landfilled CCRs (such as stabilized sulfite FGD material and FGD gypsum) results in increased beneficial utilization of CCRs in high-volume mine reclamation applications. These CCRs have already been disposed of as undesirable wastes. Secondly, harvesting CCRs (especially fly ash and incidental amounts of bottom ash) from closed-out and active impoundments will allow for removing these CCRs for high-volume beneficial use.

This project was designed to demonstrate the laboratory and construction methods applied to various ash ponds, closed FGD landfills, and abandoned coal mine sites in the United States. The results provide owners, design engineers, and regulatory agencies with specific information about the technical feasibility and probable cost of using these methods for remediation and reclamation.

1.4 Report Outline

Chapter 2 of this report extensively covers the implementation and monitoring of the Conesville Full-Scale Demonstration Project. About 2 million tons of harvested CCR materials from the closure by removal of an inactive fly ash pond and an adjacent old FGD landfill were used for the full-scale demonstration project to reclaim a nearby partially completed abandoned surface coal mine fully. Site monitoring for the project duration (about four years) was carried out, and the results are discussed.

Chapter 3 includes a description of the laboratory tests and risk analysis. The laboratory testing supported the full-scale demonstration project and the risk analysis. Geotechnical and environmental testing of harvested ponded fly ash and landfilled FGD material at the former Conesville power plant were carried out. Completing the laboratory testing allowed for QA/QC for the full-scale site construction and informed the formulation of the risk analysis. A risk analysis framework was developed using laboratory and site-specific data collected at the demonstration site. We developed a reliable computational model for fate and transport. We used these models and the rich set of monitored data for the Conesville site to analyze risks to human health and ecological risks associated with high-volume surface mine reclamation using harvested CCRs.

Chapter 4 includes a Geographic Information System (GIS) siting study to evaluate the potential use of harvested CCRs within 25 miles of five US states in the Midwest. A GIS study was carried out for three states in the Eastern coal mining region and two in the Midwest coal region. This effort provides site-specific GIS information for five states and allowed us to establish protocols other states can follow to implement their own state-specific GIS study.

Conclusions for this study are presented in Chapter 5, along with some recommendations for future work.

References are appended at the end of Chapter 5, followed by appendices.

Chapter 2: Conesville Full-Scale Demonstration Project

2.1 Project Description and Location

In this project, a pre-law abandoned highwall complex (approximately 7,800 feet long and 60 to 100 feet high) near the decommissioned Conesville power plant was reclaimed using coal combustion by-products (CCRs) generated from the power generating facility. The reclamation site is referred to as the Five Points site and is comprised of three phases. Phases 1 and 2 began as a demonstration research project that was performed by American Electric Power (AEP) in collaboration with the Department of Civil, Environmental, & Geodetic Engineering of The Ohio State University with the funding provided by the Ohio Coal Development Office to support the research associated with this demonstration project.

Based on the successful demonstration of these two phases, AEP designed Phase 3 to encompass an area to the west and east of Phases 1 and 2 in a continuation project based on the demonstrated commercial viability. OSU's research activities continue in Phase 3, which include reviewing the water quality monitoring program, regularly reviewing water quality data, and developing a comprehensive geochemical model for the site.

The project site is located on the south side of the Conesville haul road, approximately 2.0 miles east of the Conesville plant (**Figure 2-1**). The power plant was decommissioned in May 2020, and the Conesville Industrial Park LLC took over in June 2020. The site is to be developed into an industrial park.

The project site encompasses previous underground mine works conducted in the 1920s (ODNR abandoned mine No. CN-100), and surface strip mining was conducted in the 1950s – 1960s (**Figure 2-2**). The latter is the focus of the current reclamation activity utilizing coal combustion products to eliminate existing highwalls that pose a danger to the public's health and safety.

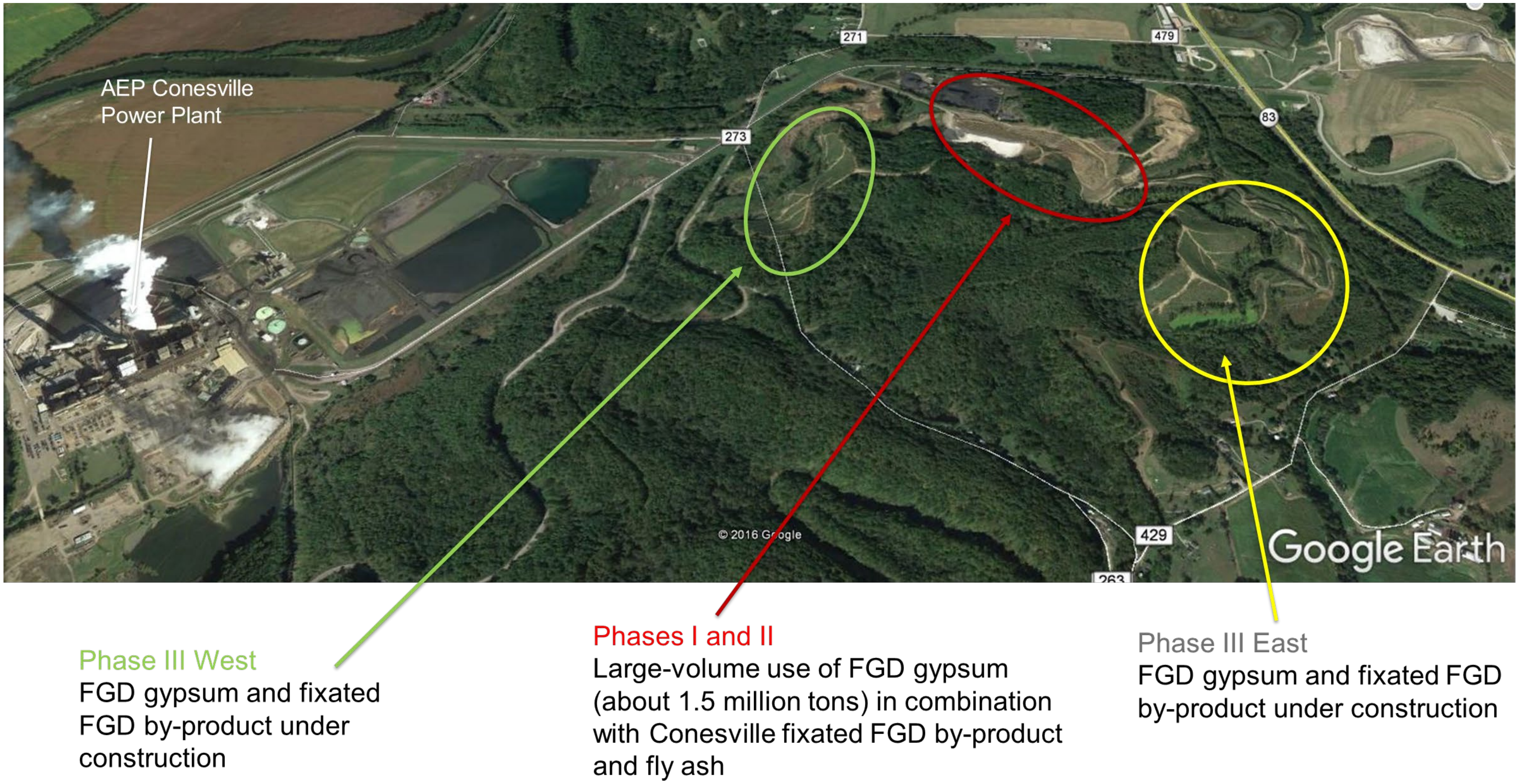

Figure 2-5. Relative locations of reclamation project sites to former AEP's Conesville Power Plant. The reclamation in Phases I/II has been completed.

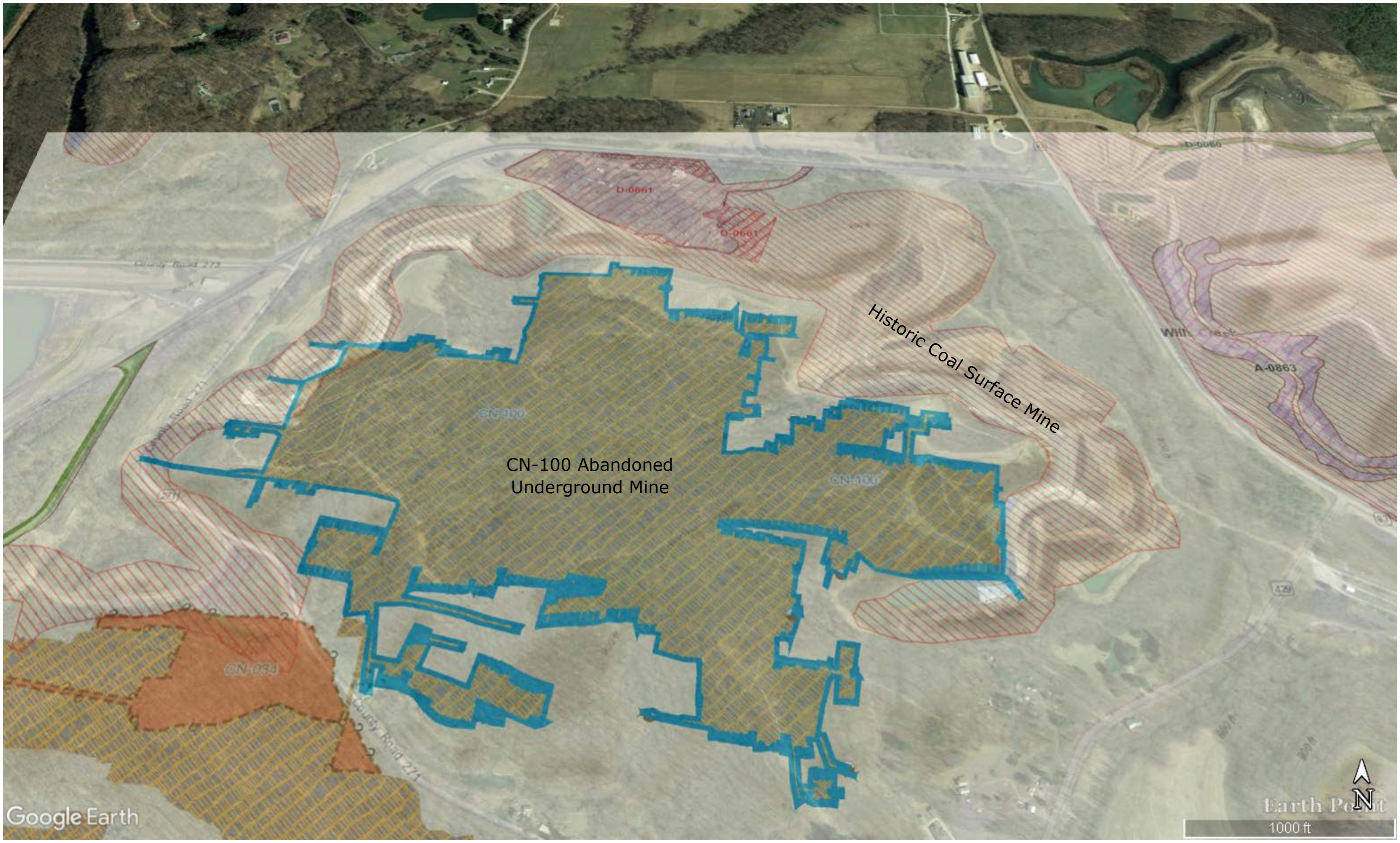

Figure 2-6. Historic surface and underground mines at Five Points site

2.2 Beneficial Volumes Utilized

From August 2011 to November 2011, construction of access roads and sediment basins, culverts, de-stumping, and surveying the construction limits were carried out at the site. The fresh FGD materials were placed in the Phase 1 area in January 2012. In November 2012, the first batch of fresh FGD material was placed in the Phase 2 area. The reclamation at Phases 1 and 2 was completed in August 2016. Approximately 1.7 million tons of freshly generated fly ash and FGD materials were placed. Over 2,400 feet of high wall has been eliminated, and about 109 acres of abandoned mined lands have been reclaimed.

Placement of coal combustion products in Phase 3 West commenced in May 2016 and was completed in 2022, with approximately 196,243 tons of freshly generated CCR materials placed within the year. (**Table 2-1**). Placement of coal combustion products in Phase 3 East commenced in July 2016 and was completed in November 2023, with approximately 436,190 tons of material placed in 2023 (**Table 2-2**). Phase 3 West and East are designed to eliminate approximately 5,400 feet of highwall and mitigate acid mine drainage observed in the Phase 3 East area. Over 2.17 million tons of coal combustion products have been placed in the combined phase III areas.

Reclamation was completed within the Phase III East area as of December 2023. Material from the on-site FGD Landfill and Ash Pond Complex were harvested and used in the reclamation of these areas.

Table 2-1. Amounts of FGD Materials Placed at Phase 3 West (through December 2023)

AML III West Project	TONNAGE												
YEAR	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YR. Total
2016													
DRY FLYASH					27	3,394	1,090	525	4,690			3,644	13,370
PONDED FLYASH						118	364	326	244	130	247		1,429
FGD					21,676	38,236	53,785	51,854	55,200	11,437	11,338	34,548	278,074
GYPSUM					1,583	10,946	15,672	12,422	15,011	1,120		13,252	70,006
ROAD ASH (Bottom Ash)					362			373	0				735
Secondary (Bottom Ash)									157			527	684
TOTAL													**364,298**
2017													
DRY FLYASH	479		3,654	4,628	4,014	2,374	1,078	902	0	0			17,129
PONDED FLYASH	104	130	391	286									911
FGD	31,950	12,617	41,668	24,074									110,309
GYPSUM	10,297		6,134	7,944	8,998	2,610	5,588	1,276	0	824			43,671
ROAD ASH (Bottom Ash)		145	360										505
Secondary (Bottom Ash)			1,289		146		528				113	636	2,712
U5-6 Limestone FGD					3,804	7,604	6,094	902	0	0	820	2,666	21,890
TOTAL													**197,127**
2018													
DRY FLYASH	532	0	1,610	3,473	749	10,231	2,868	1,261	0		3,565	4,207	28,496
PONDED FLYASH													0
FGD													0
GYPSUM	2,083	0	133	14,531		12,678	3,058	2,575	0		3,179	14,021	52,258
ROAD ASH (Bottom Ash)													0
Secondary (Bottom Ash)				4,831		573		224	0		1,024	1,892	8,544
U5-6 Limestone FGD		0	7,364	389	4,127	17,138	1,437	1,212	288	583	4,194	4,238	40,970
TOTAL													**130,268**
2019													
DRY FLYASH	0	0	0	0	0	0	0	0	0	0	0	0	0
PONDED FLYASH	0	0	0	0	0	0	0	0	0	0	0	0	0
FGD	0	0	0	0	0	0	0	0	0	0	0	0	0
GYPSUM	0	0	0	0	0	0	0	0	0	0	0	0	0
ROAD ASH (Bottom Ash)	0	0	0	0	0	0	0	0	0	0	0	0	0
Secondary (Bottom Ash)	0	0	0	0	0	0	0	0	0	0	0	0	0
U5-6 Limestone FGD	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL													**0**
2020													
DRY FLYASH	0	0	0	0	0	0	0	0	0	0	0	0	0
PONDED FLYASH	0	0	0	0	0	0	0	0	0	0	0	0	0
FGD	0	0	0	0	0	0	0	0	0	0	0	0	0
GYPSUM	0	0	0	0	0	0	0	0	0	0	0	0	0
ROAD ASH (Bottom Ash)	0	0	0	0	0	0	0	0	0	0	0	0	0
Secondary (Bottom Ash)	0	0	0	0	0	0	0	0	0	0	0	0	0
U5-6 Limestone FGD	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL													**0**
2021													
FGD	0	0	0	0	0	0	5,972	2,243	0	0	12,449	10,811	31,475
Ponded Bottom Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Ponded Fly Ash	0	0	0	0	0	0	0	2,275	0	0	173	0	2,448
Total													**33,923**
2022													
FGD	0	2,999	22,151	5,494	5,292	4,536	6,980	20,210	24,343	49,115	0	0	141,120
Ponded Ash	0	0	0	7,718	5,011	8,093	5,962	17,568	10,627	144	0	0	55,123
TOTAL													**196,243**
AML West Complete November 2022													

Table 2-2. Amounts of FGD Materials Placed at Phase 3 East (through December 2023)

AML III East Project	TONNAGE											
YEAR	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YR. Total
2016													
DRY FLYASH													0
PONDED FLYASH													
FGD							4,171	19,854	2,629				26,654
GYPSUM			14,742	36,162	32,861	49,921	27,266	47,477	62,856				271,285
ROAD ASH (Bottom Ash)			9,763	21,312	28,339	11,232	27,936	27,274	2,424				128,280
Secondary(Bottom Ash)													
TOTAL													**426,219**
2017													
DRY FLYASH			3,970	2,308	2,565	7,134	6,116	18,031	9,669	4,104		1,153	55,050
PONDED FLYASH						536							536
FGD	7,380	1,495	12,478	8,599									29,952
GYPSUM			6,788	3,595	3,541	6,370	4,862	15,978	13,008	10,552		826	65,520
ROAD ASH (Bottom Ash)	205												205
Secondary(Bottom Ash)				444		3,542	374	360	2,466	509	2,029	1,432	11,156
U5-6 Limestone FGD					5,883	13,612	18,986	31,557	18,937	40,355	20,227	17,383	166,940
TOTAL													**329,359**
2018													
DRY FLYASH	4,578	5,441	2,642	1,526	116	0	12,704	15,651	3,572	9,859	1,748	6,781	64,618
PONDED FLYASH													0
FGD													0
GYPSUM	18,838	8,161	7,222	5,905	1,132	0	17,779	15,461	4,512	16,344	2,318	10,268	107,940
ROAD ASH (Bottom Ash)													0
Secondary(Bottom Ash)	103	170			275	0	214	1,262	735		59	274	3,092
U5-6 Limestone FGD	22,512	15,999	12,186	258	5,298	0	10,880	18,711	5,425	24,959	7,462		123,690
TOTAL													**299,340**
2019													
DRY FLYASH	9,092	1,193	3,508	3,779	8,686	2,269	0	0	0	0	0	0	28,527
PONDED FLYASH							0	0	0	0	0	0	0
FGD							0	0	0	0	0	0	0
GYPSUM	15,666	3,823	5,833	4,791	14,962	4,211	0	0	0	0	0	0	49,286
ROAD ASH (Bottom Ash)							0	0	0	0	0	0	0
Secondary(Bottom Ash)	1,005	820			462		0	0	0	0	0	0	2,287
U5-6 Limestone FGD	4,997	1,504					0	0	0	0	0	0	6,501
TOTAL													**86,601**
2020													
DRY FLYASH	0	0	0	0	0	0	0	0	0	0	0	0	0
PONDED FLYASH	0	0	0	0	0	0	0	0	0	0	0	0	0
FGD	0	0	0	0	0	0	0	0	0	0	0	0	0
GYPSUM	0	0	0	0	0	0	0	0	0	0	0	0	0
ROAD ASH (Bottom Ash)	0	0	0	0	0	0	0	0	0	0	0	0	0
Secondary(Bottom Ash)	0	0	0	0	0	0	0	0	0	0	0	0	0
U5-6 Limestone FGD	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL													**0**
2021													
FGD	0	0	0	0	0	0	0	57,280	12,751	11,290	27,418	19,379	128,118
Ponded Bottom Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Ponded Fly Ash	0	0	0	0	0	0	0	3,082	12,154	13,248	22,637	0	51,121
TOTAL													**179,238**
2022													
FGD	0	2,369	27,191	28,703	12,197	10,735	23,310	23,083	14,717	20,689	28,073	18,698	209,765
Ponded Fly Ash	0	0	9,446	19,786	19,210	27,533	15,638	49,651	22,435	17,510	20,131	25,085	226,425
TOTAL													**436,190**
2023													
FGD	0	0	14,742	36,162	32,861	49,921	27,266	47,477	62,856	7,661	0	0	278,946
Ponded Fly Ash	8,582	0	9,763	21,312	28,339	11,232	27,936	27,274	2,424	344	0	0	137,206
TOTAL													**416,152**
TOTAL PROJECT													**2,173,099.2**

2.3 Reclamation Process

Phase 1 & 2: Site construction activities commenced in 2009 with the drilling and installation of the ground water monitoring wells for Phases 1 and 2. Additional site construction activities occurred in 2011 for the construction of erosion and sediment control structures related to the management of stormwater during construction activities, clearing and grubbing of vegetation, and construction of site access roads into the strip pit area. Placement of the FGD materials in the Phase 1 area began in January of 2012. In November 2012, the first batch of FGD material was placed in the Phase II area. Stabilized FGD sulfite material generated at the plant was used as a liner below, and cap over the FGD gypsum fill. The reclamation at Phases 1 and 2 followed the Appalachian Regional Reforestation Initiative (ARRI) approach. This approach is characterized by the use of local end-dumped spoil piles placed in an interlocking manner to encourage saturation, limit off-site erosion, and provide a medium that promotes tree survival and growth. Compatible grasses were also planted to prevent erosion. A mixture of deciduous trees and conifer seedlings was planted in 2016. The success criteria in which a 70% survivability was achieved after two growing seasons. The groundwater monitoring program for Phases 1 and 2 was ended in 2020.

Phase 3: Site construction commenced in 2014 with drilling and installing ground water monitoring wells for Phase 3 West and East reclamation area. Additional site construction activities occurred in 2015 for the construction of erosion and sediment control structures related to the management of stormwater during construction activities, clearing and grubbing of vegetation, and construction of site access roads into the strip pit area along with storm water retention – detention ponds. Site construction activities resumed in 2021, beginning with clearing and grubbing vegetation and installing stormwater management features. Phase 3, West and East, have been completed and reclaimed with coal combustion residues as of October 11, 2023. The final protective cover was placed in the Phase 3 East area on November 11, 2023. Seeding, mulching, and general maintenance of the area were also completed.

2.4 Water Quality Monitoring

The environmental monitoring network at the reclamation site comprises 25 groundwater monitoring wells and ten surface water sampling locations (**Figure 2-3**). The geological condition of each well on the screen is summarized in **Table 2-3**.

For groundwater sampling, the static water level was measured and recorded to the nearest hundredth of a foot before purging and sampling the groundwater in each well. To minimize turbidity, the groundwater sample was collected using a low-flow purging and sampling procedure. Water's pH, conductivity, and turbidity during purging were continuously monitored and recorded. The purging was stopped when all three parameters stabilized. Purge water was collected in a 5-gallon HDPE bucket and disposed of away from the well surface seal after the whole purging and sampling procedure is completed for the well.

After purging, the water sample was collected in three 500-mL HDPE sample bottles, one 250-mL HDPE sample bottle, and one 1-L HDPE sample Bottle. For a given well, two of the 500-mL sample bottles is preserved with 2% nitric acid for elemental analysis (one dissolved field filtered and the other unfiltered). All sampling and analysis were completed according the sampling and analysis plan. Surface water samples were also collected. The analytical results from unfiltered samples represent the overall concentration levels (i.e., both in dissolved and particulate form) of constituents in the water.

Table 2-3. Geological Conditions at the Screens of Groundwater Monitoring Wells at Conesville Five Points Site

Well	Screen		Geological Condition	
	Top	Bottom	Lithology	Stratigraphic Member
MW-0901	832.8	823.1	siltstone, clay shale, coal	L. Freeport Ss/Sh, MK No.6
MW-0902	820.6	810.6	shale (Bottom of minespoil),	L. Freeport Ss/Sh, MK No.6
MW-1001	823.6	813.9	clay shale, sandstone	Sand (backfilled to replace
MW-0903	849.0	839.4	Mine spoils, some silt	Minespoil
MW-0904	809.9	800.2	mine spoils, clayshale	Sdy Minespoil
MW-0905	784.8	775.1	sandstone	Clarion Ss
MW-0906	799.6	789.9	fine sand, clay	Glacial-fluvial sands
MW-1101D	763.5	743.9	sandstone	Clarion Ss
MW-1101S	805.4	800.8	sand, minespoil	Minespoil, Glacial-fluvial sands
MW-1401	823.5	813.9	shale, coal	L. Freeport ST/SH, No.6 Coal
MW-1402	762.5	732.9	sandstone	Clarion Ss
MW-1403	830.7	821.1	clay, coal	L. Freeport Ss/Sh, MK No.6
MW-1404	742.1	722.5	sandstone, clayshale	Clarion Ss
MW-1405	803.5	793.9	shale, coal, shale	LK No.5 Coal
MW-1406	759.9	730.3	shale, limestone, coal	Putnam Ls, No.4 Coal
MW-1407	789.5	779.9	sdy shly minespoil	Minespoil
MW-1408	753.7	734.1	sandstone	Clarion Ss
MW-1409	798.5	788.9	clayshale, coal, clayshale	Sh, LK No 5 Coal, Fireclay
MW-1507C	763.3	734.0	sandstone	Clarion Ss
MW-1507S	836.3	816.7	shale, coal	L. Freeport ST/SH, No.6 Coal
MW-1701	770.6	741.0	sandstone, fireclay, clayshale	Clarion Ss
MW-1702	813.7	804.1	sdy shly minespoil	Minespoil
MW-1703	820.3	810.7	sdy shly minespoil	Minespoil
MW-1704	769.4	749.8	sandstone, fireclay, shale,	Clarion Ss
MW-1705	823.1	813.5	stabilized FGD	FGD fill
MW-2101	764.5	749.5	sandstone	Clarion SS
MW-2102	812.7	807.7	mine void	CN-100 Mine Void
MW-2103	845.1	839.6	mine void	CN-100 Mine Void/fire clay

During each sampling event, field duplicates were used as part of the QA/QC procedure. The duplicate samples were taken from one randomly-selected well to avoid bias. Field duplicate samples were collected simultaneously with the primary samples and analyzed for all constituents analyzed in the primary samples. The QA/QC samples were analyzed for the same parameters as the other water quality samples.

The data collected during the project duration till December 2023 are discussed in this report. The groundwater monitoring program for Phases 1 and 2 was ended in 2020. No samples were collected from the area during this reporting period.

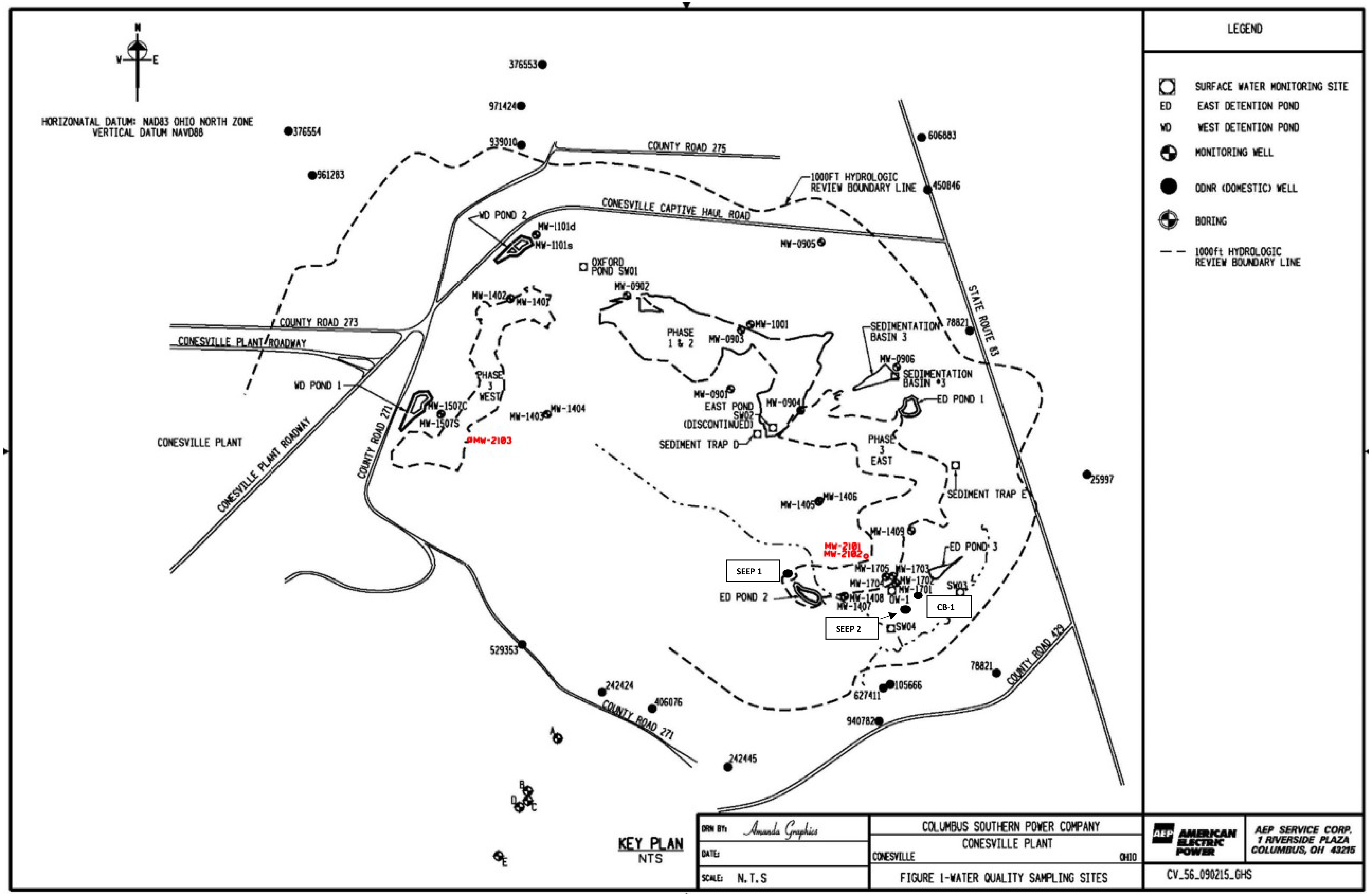

Figure 2-3. Map of water quality monitoring locations

2.5 Water Quality Analysis

2.5.1 Static Water Level

The hydrographs of all Phase 3 groundwater wells are shown in **Figure 2-4.** As shown in the figure, during this reporting period, the static water levels (SWLs) in all monitoring wells are near normal. Monitoring well MW-1405, however, has experienced a slight increase in SWLs.

According to the precipitation record provided by a NOAA National Weather Service Station, GHCND:USC00331890, Coshocton WPC Plant, located approximately 5 miles northwest of the site, the area's average monthly precipitation rate in 2023 was 3.42 inches. A seasonal high of 6.70 inches occurred in July, and a seasonal low of 0.61 inches occurred in September. Reclamation progress backfilled 100 % of the east pit during this reporting period.

(a)

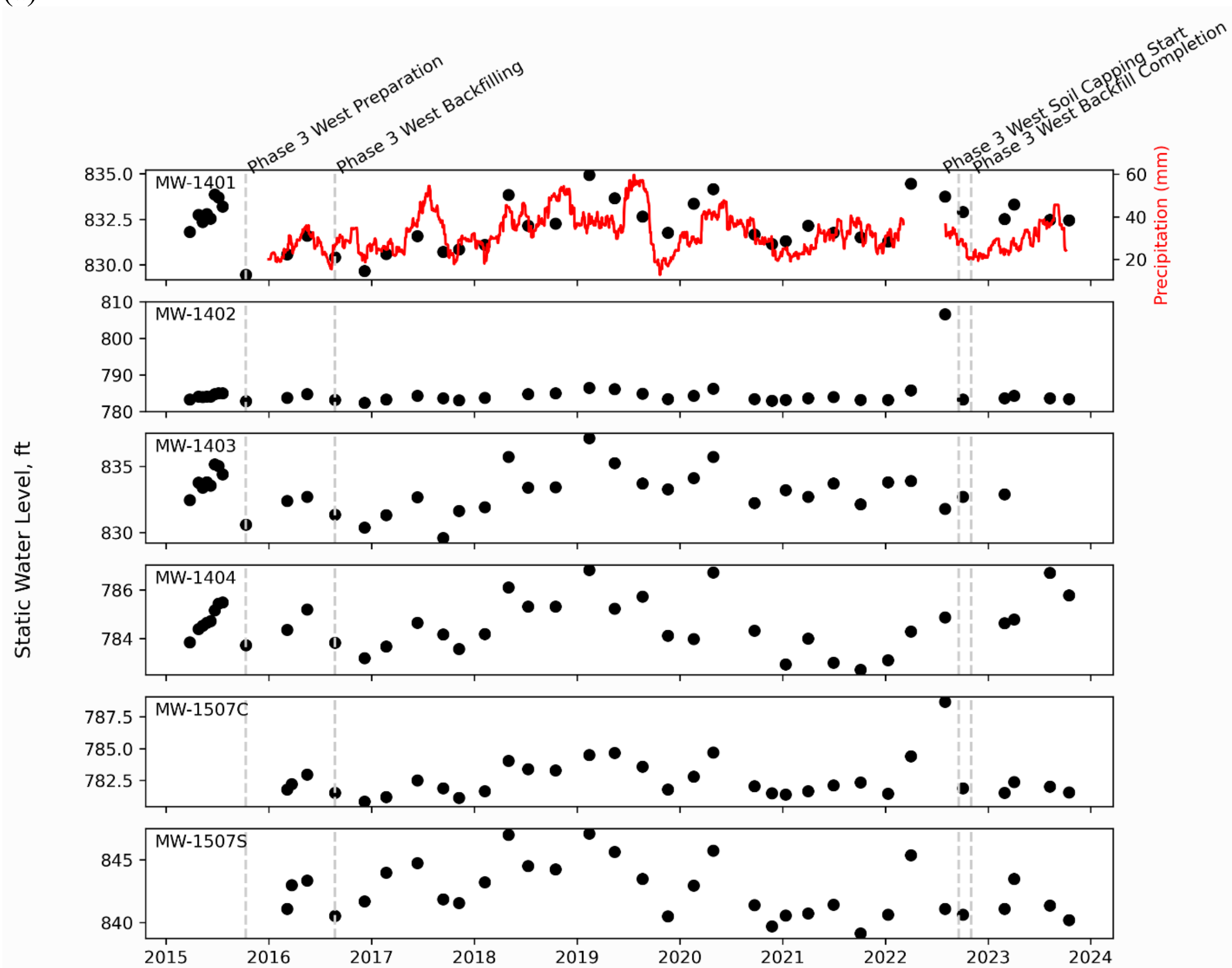

Figure 2-4. Hydrographs of monitoring wells at Phases 3 (a) West and (b) East.

(b)

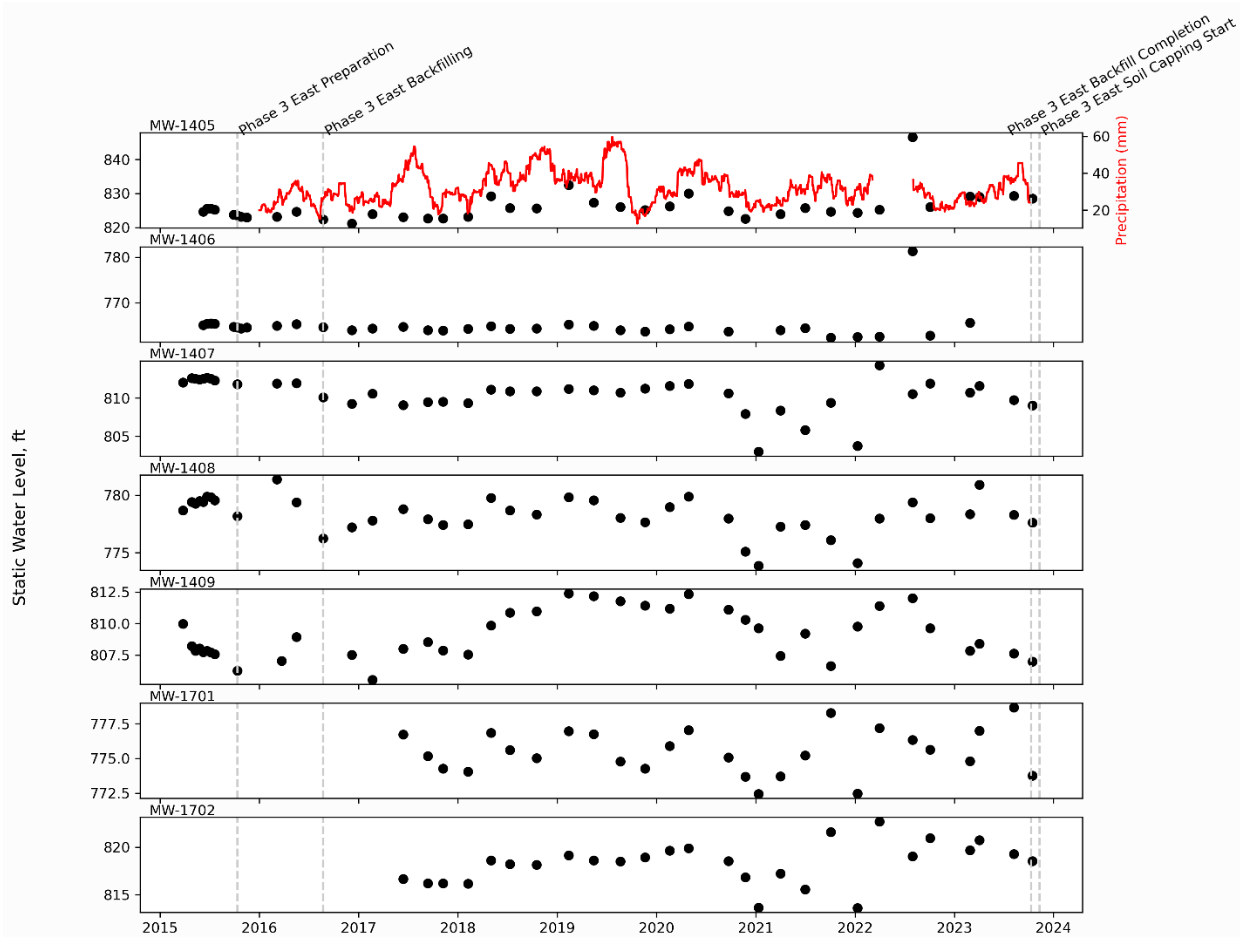

Figure 2-4. (Cont'd) Hydrographs of monitoring wells at Phase 3 (a) West and (b) East.

2.5.2 Groundwater in Phase 3 West

The temporal trends of TDS in the six monitoring wells located in the Phase 3 West area, i.e., MW-1401, MW-1402, MW-1403, MW-1404, MW-1507S, and MW-1507C, are shown in **Figure 2-5**. The TDS levels in the deep Clarion Sandstone aquifer (i.e., MW-1402, MW-1404, and MW-1507C) remained steady at approximately 200 mg/L.

For monitoring well MW-1507S, which is installed in the Middle Kittanning #6 coal, the concentrations of TDS followed a substantial decreasing trend.

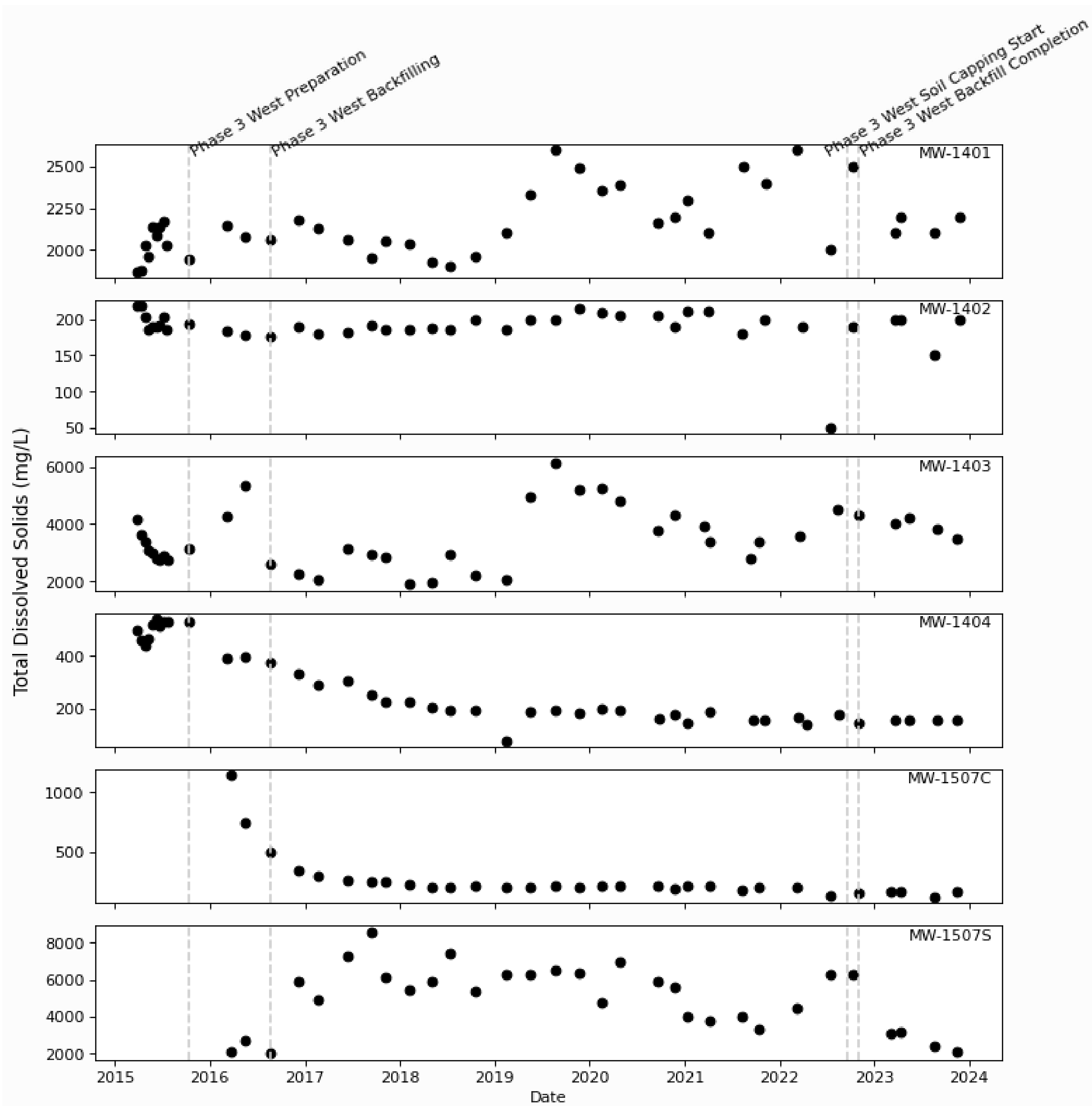

Figure 2-5. Temporal trends of total dissolve solids in water samples collected from Phases 3 West monitoring wells

2.5.2.1 Deep Clarion Sandstone Aquifer

Data collected indicated that the deep aquifer underlying the area remained unaffected by the reclamation. The Clarion Sandstone aquifer continued to exhibit low total dissolved solids and lower concentrations of major constituents, reflecting the fact that these monitoring wells were located close to the recharge area for this formation.

2.5.2.2 Shallow Perched Aquifer

For MW-1401, the concentrations of major constituents, e.g., Ca, sulfate, Fe, Mg, Na, and Cl (a)) started to increase in 2019 (**Figure 2-5**). Except for Na, the increasing trends of these constituents reached their plateaus in 2021 -2022 and have remained relatively constant during this reporting period. The increasing trend continued for Na. The equivalent ratios of Na to Cl (Na/Cl) and Ca to sulfate (Ca/Sulfate) started changing in 2019 and have remained relatively consistent for this 2023 reporting period. (**Figure 2-6**).

With pH remaining at a constant level, the observations suggest the water quality was less controlled by carbonates and more dominated by sulfate. With increasing B concentration, it implies that the water quality in the shallow perched table that is downgradient of the Phase 3 West reclamation area has started showing the influence of the reclamation fill placement. MW-1403.

MW-1403 is a hydraulically up-gradient well, which screens mainly in the clay shale (821.1-830.7 ft.) approximately ten ft. below CN-100, an abandoned underground mine (**Figures 2-3 and 2-8**). In February 2019, a record-high SWL (837.1 ft.) was reported, reaching the bottom of the 8-ft. underground mine void. The elevated water level might have inundated the geologic layer bearing pyrite (or other acid-producing materials) and carbonates, which caused the abrupt changes in the water quality and hydrogeochemical characteristics in 2019.

Except for Na and Cl, the concentrations of other major constituents continued following the decreasing trends in 2020. Fe, Mn, and sulfate concentrations started to decline again in late 2022 and continued to decline during this reporting period (**Figure 2-6(b)**). Similar trends are also observed for Ca, Mg, and sulfate. The pH decreased in the 3rd quarter to 5.73 su, with a subsequent recovery in the fourth quarter sampling event. Na and Cl are the only two constituents showing steadily increasing concentrations. Concentrations for B also showed an increase in this reporting period and is reflected in a decrease in the CA/B ratio (**Figure 2.7)**. The observations from this reporting period suggest that the water quality in this well is following a trend of recovery from the abrupt change in 2019.

(a)

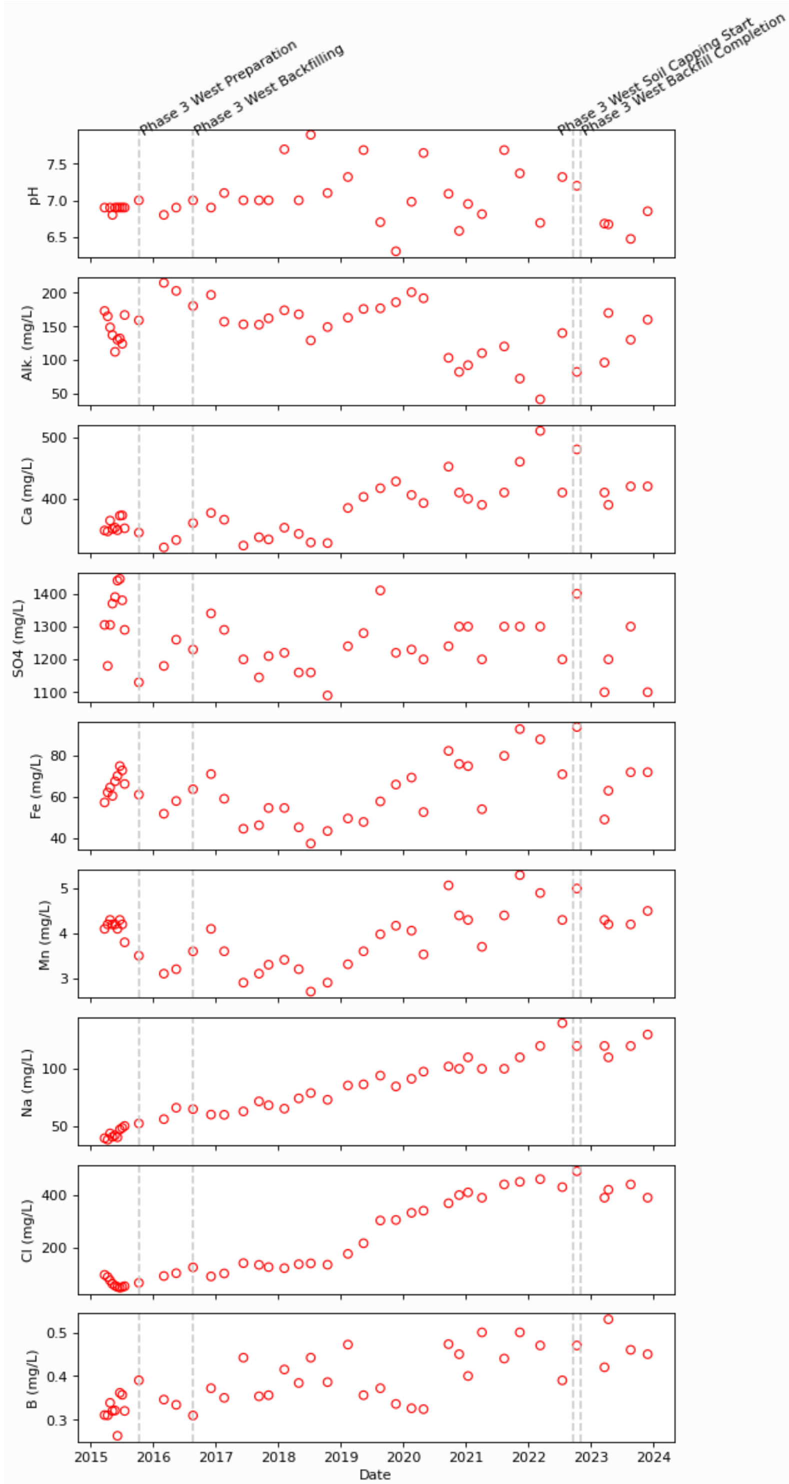

Figure 2-6. Temporal trends of major constituents and stoichiometric ratios of major cations and anions in (a) MW-1401 and (b) MW-1403.

(b)

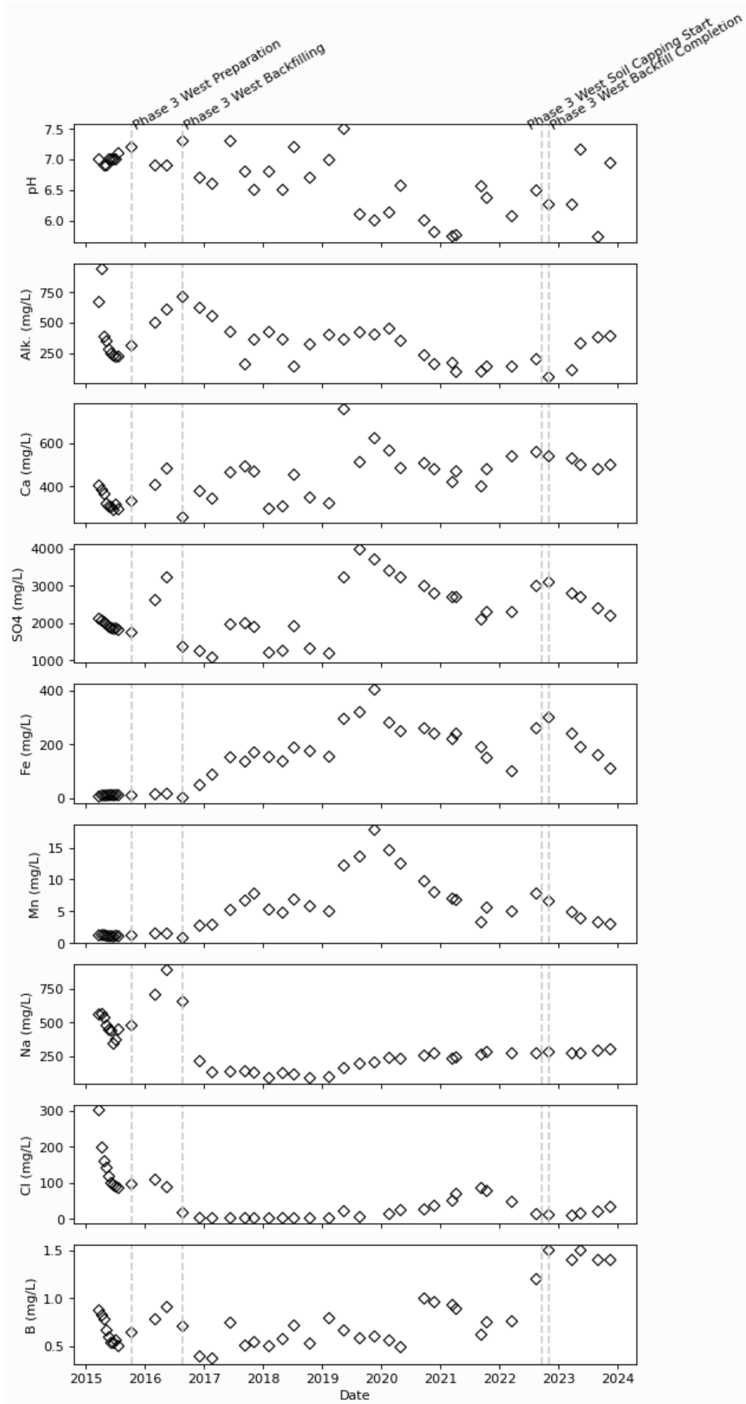

Figure 2-6. Temporal trends of major **constituents** and stoichiometric ratios of major cations and anions in (a) MW-1401 and (b) MW-1403.

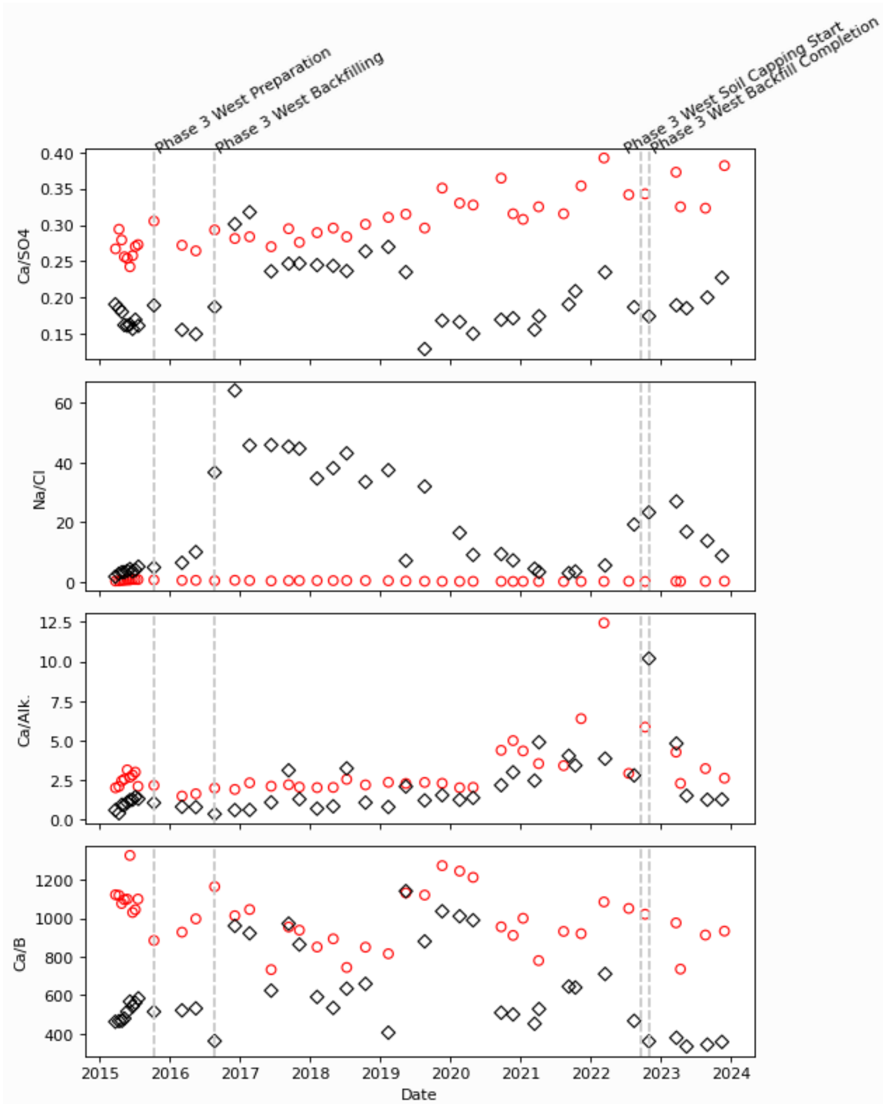

Figure 2-7. Equivalent ratios of Ca to sulfate (Ca/SO4), Na to Cl (Na/Cl), Ca to alkalinity (Ca/Alk), and Ca to B (Ca/B) in MW-1401 and MW-1403**.**

Figure 2-8. Overlaying map showing the boundary of CN-100 abandoned underground mine in Phase 3 West area.

2.5.2.3 Shallow Perched Aquifer in Mine Spoil

The concentration levels of all major constituents, such as B, Ca, Cl, sulfate, Na, Cl, Mg, Mn, and B, had remained relatively constant since 2017 in Phase 3 West MW-1507s until this reporting period. As demonstrated in (**Figure 2-9(a)**), the concentrations of these major constituents significantly decreased during this reporting period approaching pre-reclamation water quality values, which is likely associated with the capping of Phase 3 West in 2022 and an increase of alkalinity in 2023 (i.e. geochemical weathering of calcium cements within the sandstone soil capping layer). Also, there is a notable increase in Fe concentrations which may reflect the oxidation of sulfides in the mine spoil capping layer. The equivalent ratio of Ca/sulfate increased while the Na/Cl, Ca/Alk, and Ca/B ratios remained at a .relatively low level (**Figure 2-9(b)**).

(a)

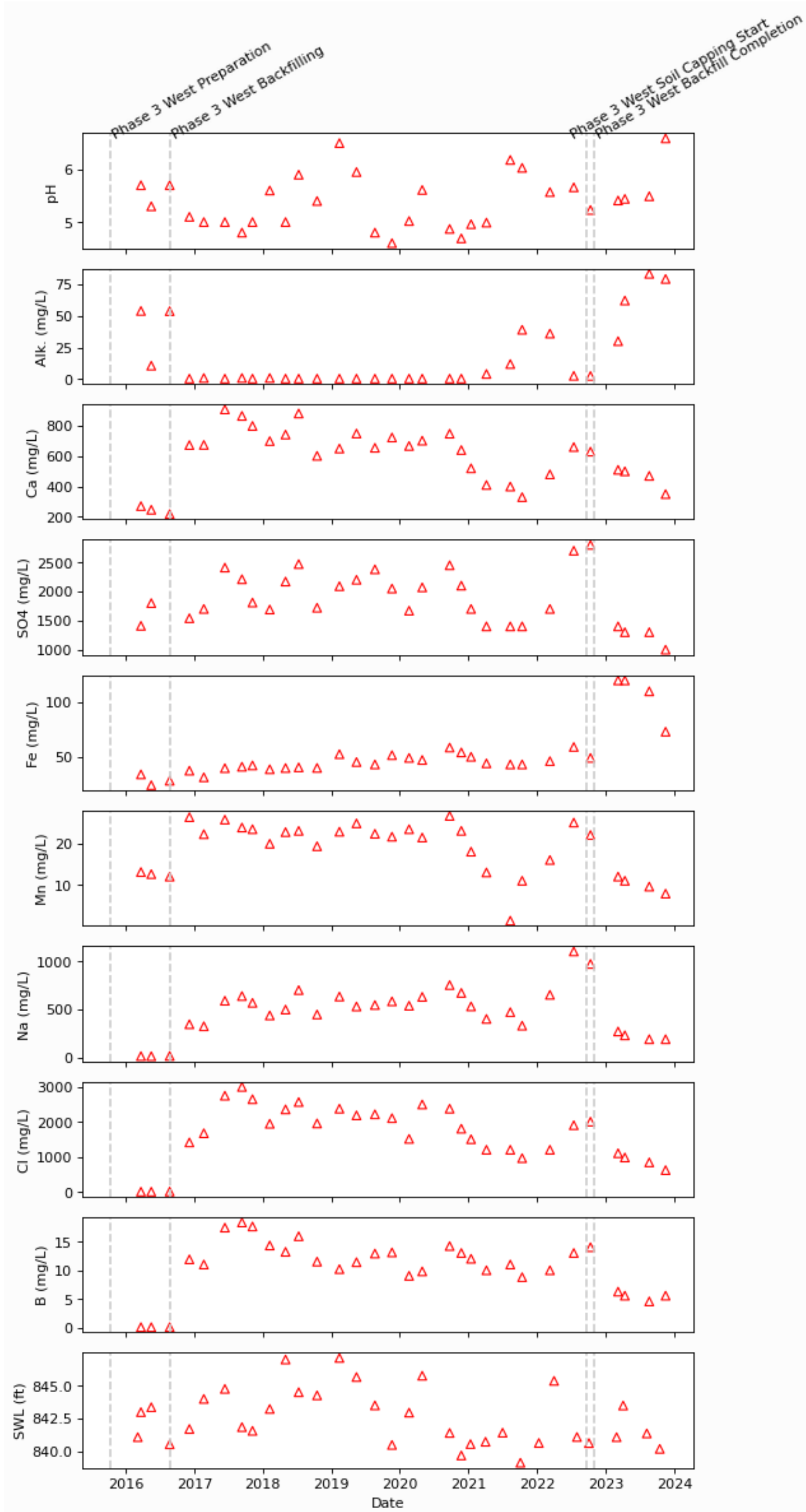

Figure 2-9. Temporal trends of (a) major constituents and (b) stoichiometric ratios of major cations and anions in MW-1507S.

(b)

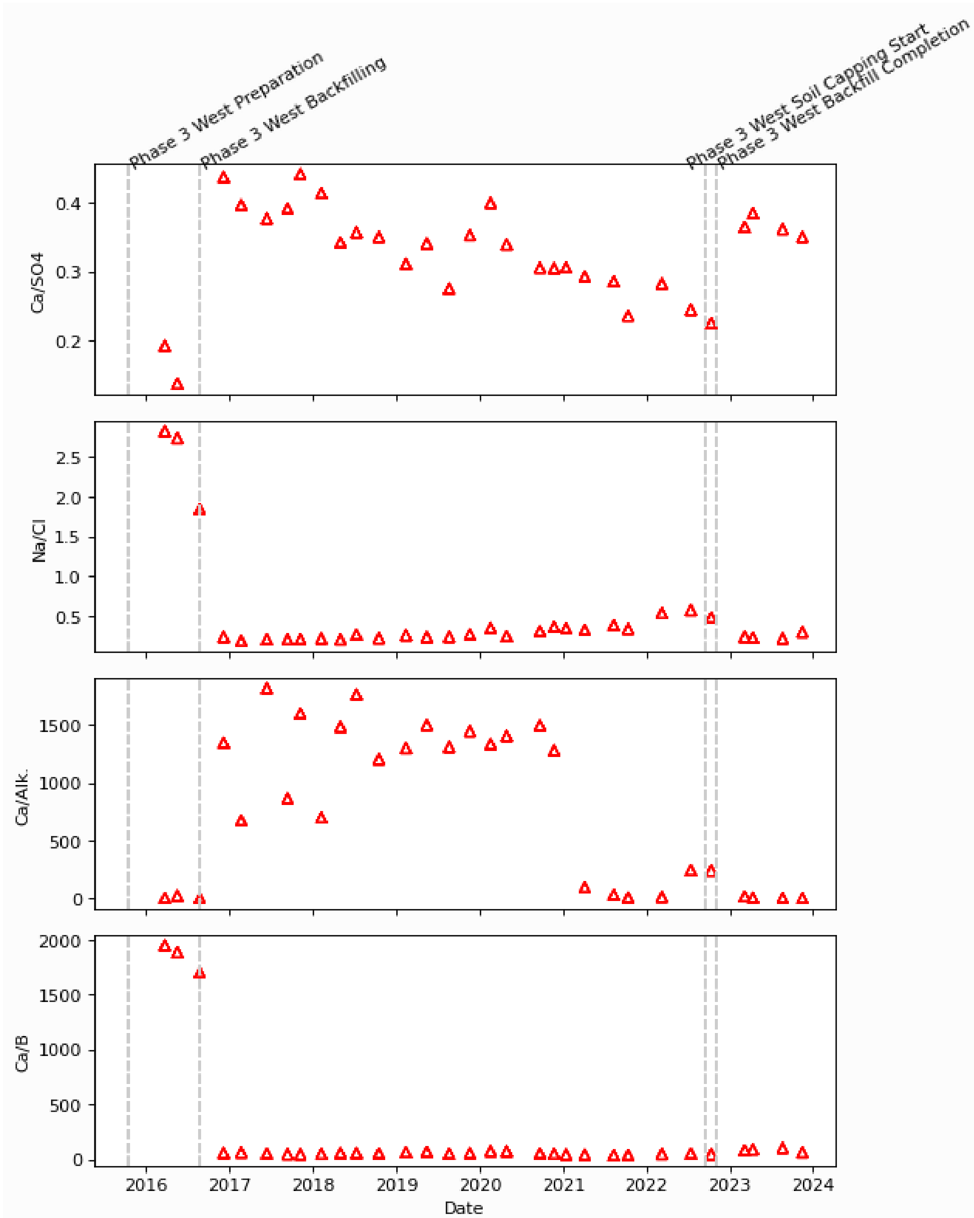

Figure 2-9. (Cont'd) Temporal trends of (a) major constituents and (b) stoichiometric ratios of major cations and anions in MW-1507S.

2.5.3 Groundwater in Phase 3 East

The temporal trends of TDS in the water samples collected from the seven (7) monitoring wells located in the Phase 3 East area, i.e., MW-1405, MW-1406, MW-1407, MW-1408, MW-1409, MW-1701, MW-1702, and MW-1705, are shown in **Figure 2-10**. MW-1705 was closed and grouted in October 2021 but is included in **Figure 2-10** since it compares mine waters acting within the fixated FGD fill.

In 2023, the TDS levels in the deep Clarion Sandstone aquifer monitoring wells, MW-1406, MW-1408, and MW-1701, were generally similar or lower than those observed in previous years. Monitoring wells installed within the perched water table were similar to last year's values except MW-1405 and MW-1409. A general decrease in TDS occurred most notably at MW-1405, while MW-1409 experienced a substantial increase. The Ohio DNR performed a borehole camera survey of MW-1409 on July 11, 2023, and concluded that there was considerable presence of iron bacteria within the well. Iron bacteria substantially influences groundwater quality in many respects but does not necessarily explain increases in B concentrations that were also observed to occur.

It appears that mine spoil and/or coal mine drainage continue to significantly control the water quality in this area.

(a)

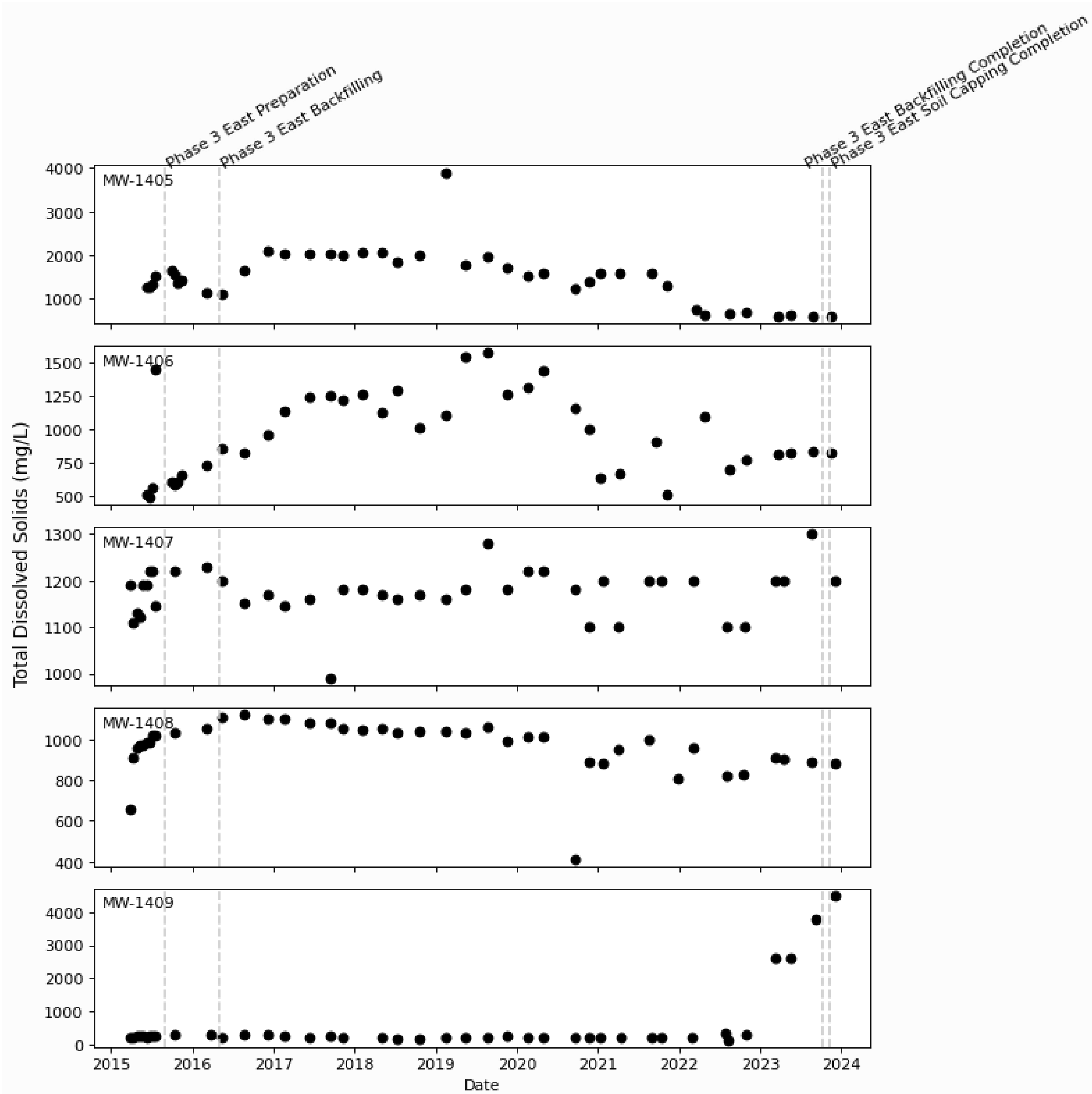

Figure 2-10. Temporal trends of total dissolved solids in water samples collected from Phases 3 East monitoring wells. (a) MW-1405~MW-1409 and (b) MW-1701~MW-1705.

(b)

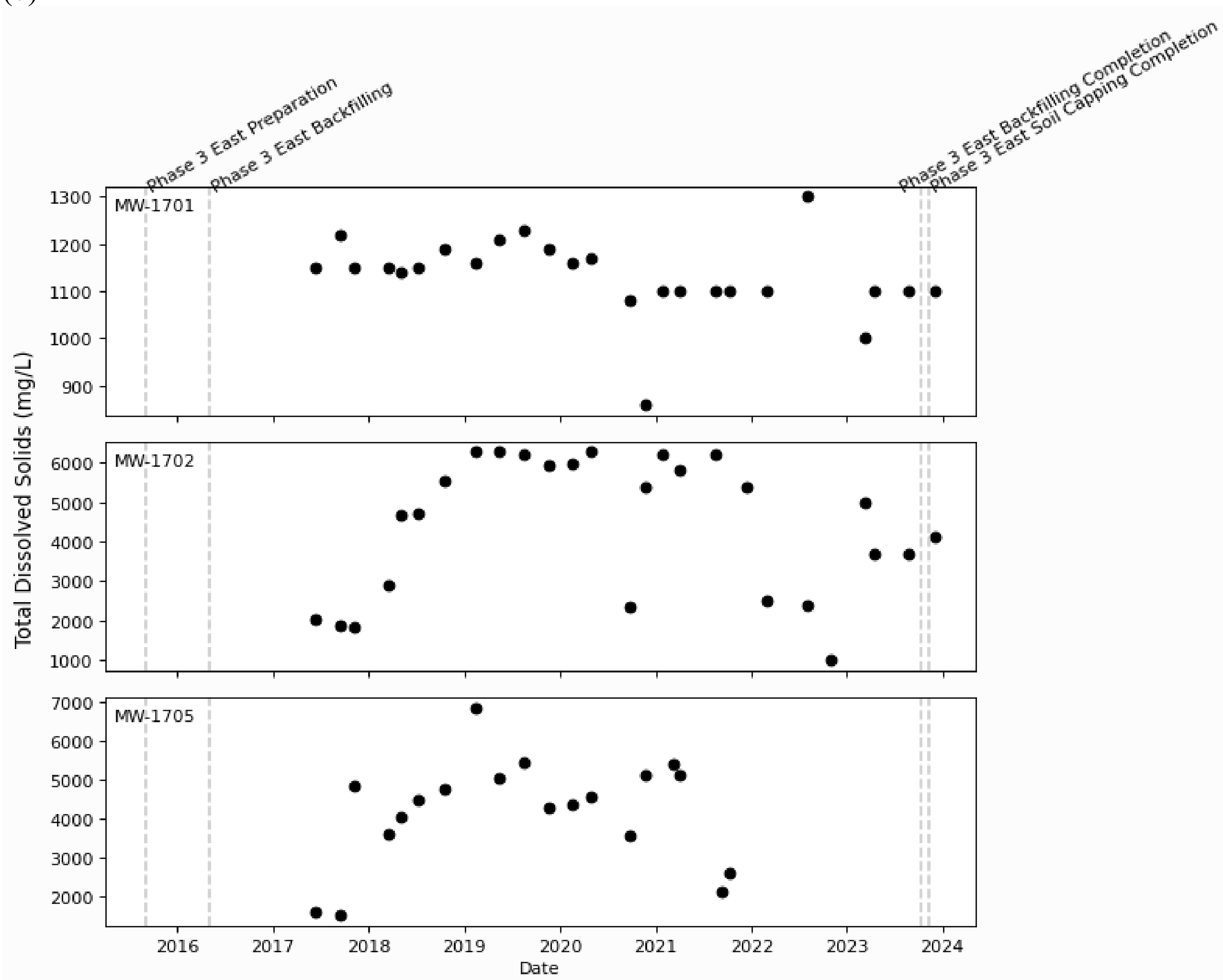

Figure 2-10. (Cont'd) Temporal trends of total dissolved solids in water samples collected from Phases 3 East monitoring wells. (a) MW-1405~MW-1409 and (b) MW-1701~MW-1705.

2.5.3.1 Deep Clarion Aquifer

The water samples collected from the deep Clarion aquifer (MW-1406, MW-1408, and MW-1701) are more alkaline and contain less dissolved constituents such as Cl, sulfate, Ca, Mg, Fe, Na, and Mn, than the samples from the disturbed shallow perched water table do, i.e., MW-1702, and MW-1705. Compared to the sandstone layer in the deep Clarion aquifer (MW-1408 and MW-1701), the water in the limestone layer (MW-1406) has higher pH, alkalinity, B, and Na (i.e. a sodium bicarbonate type water characteristic of recharge seeping through the overlying shale layers).

2.5.3.2 Shallow Perched Aquifer

The water samples from MW-1409, screening mostly in the undisturbed clay shale layer and the Lower Kittanning No. 5 Coal of the shallow perched water table, contained low concentrations of major constituents until 2023. The concentrations of major cations and anions at MW-1409 increased substantially in 2023, suggesting a new recharge source either from the CN-100 mine and/or the influence of the reclamation in the Phase 3 East area. Concentrations of B, Fe, Mn, and Sr all increased in 2023 and appear to trend upwards.

FGD Fill and Mine Spoil Layer: A comparison between the water quality in the mine spoil bank abutting down-gradient of (MW-1702) and away from (MW-1407) the FGD fill in the reclaimed Phase 3 East pit offers a glimpse into the impact of the backfilled FGD material on the shallow perched water table. In part, water quality changes are more prominent at MW-1702 because of its proximity to discharge from CN-100's mine adit. Since the backfill in the east pit began, constituents such as Ca, sulfate, Na, Cl, Mg, and B have become higher in MW-1702 screened within the mine spoil layer adjacent to the FGD fill and trended closely with MW-1705 (source characterization well). The perched water table has changed from undersaturated to saturated with gypsum after the 2nd quarter of 2018. Gypsum is one of the major minerals in the backfilled FGD material and minespoil.

The concentrations of Ca were similar at MW-1702 and MW-1705. However, sulfate is higher in the mine spoil (MW-1702) than in the FGD fill (MW-1705). It is also true for a number of major constituents, such as Mg, and Na. It is plausible due to the presence of other sulfate salts, such as thenardite, bloedite, konyaite, loweite, eugsterite, nitratine, and natrojarosite [Zielinski et al., 2001], or soluble Na- and Mg-bearing silicates, such as chlorites [Clark et al., 2018], commonly found in minespoil.

Monitoring well MW-1407 has also increased in Cl concentrations from 10 mg/l from its initial sampling in 2015 to 120 mg/l in the fourth quarter (December 2023).

This suggests the same water-mineral interactions between the AMD emanating from the upgradient underground mine (CN-100) and the backfilled FGD material, as well as the mine spoil, in the east pit, have controlled the water quality of the shallow perched water table. **Figure 2-12** shows the boundary of the CN-100 abandoned underground mine in the Phase 3 East area.

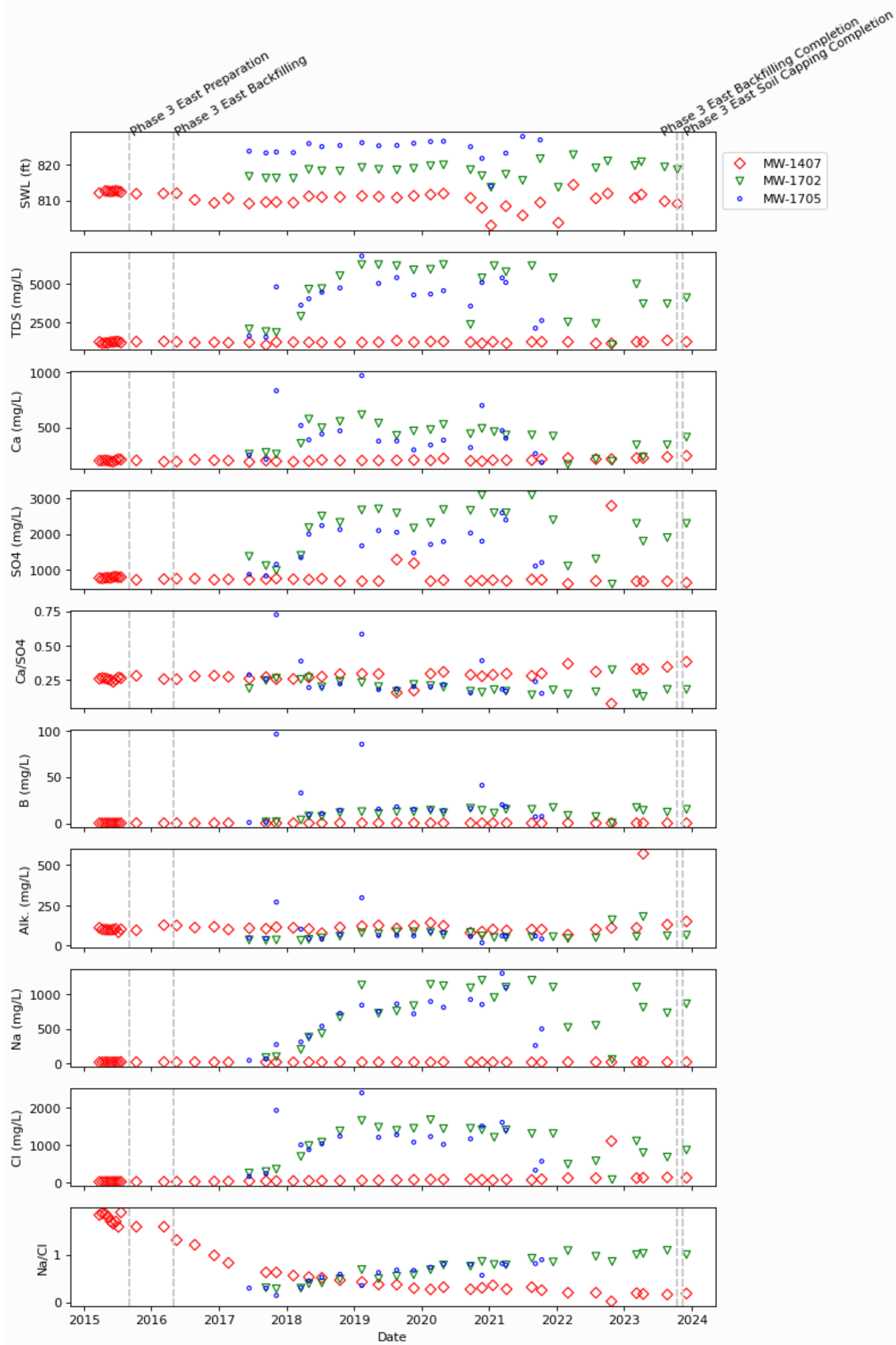

Figure 2-11. Temporal trends of major constituents in the shallow perched water table for (a) MW-1407, MW-1702and MW-1705 (b) MW-1409, MW-1702 and MW-1705.

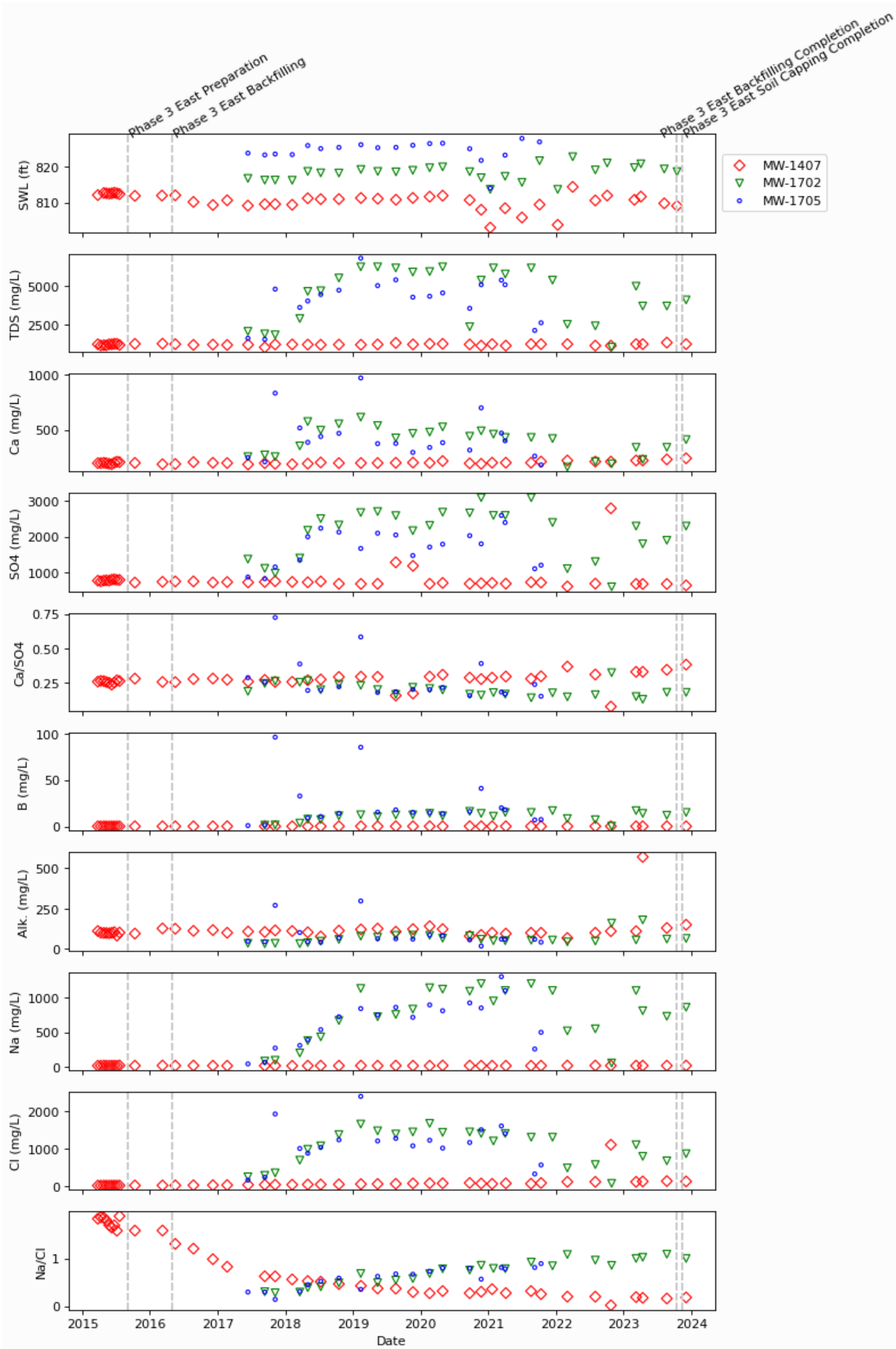

Figure 2-11. Temporal trends of major constituents in the shallow perched water table for (a) MW-1407, MW-1702and MW-1705 (b) MW-1409, MW-1702 and MW-1705.

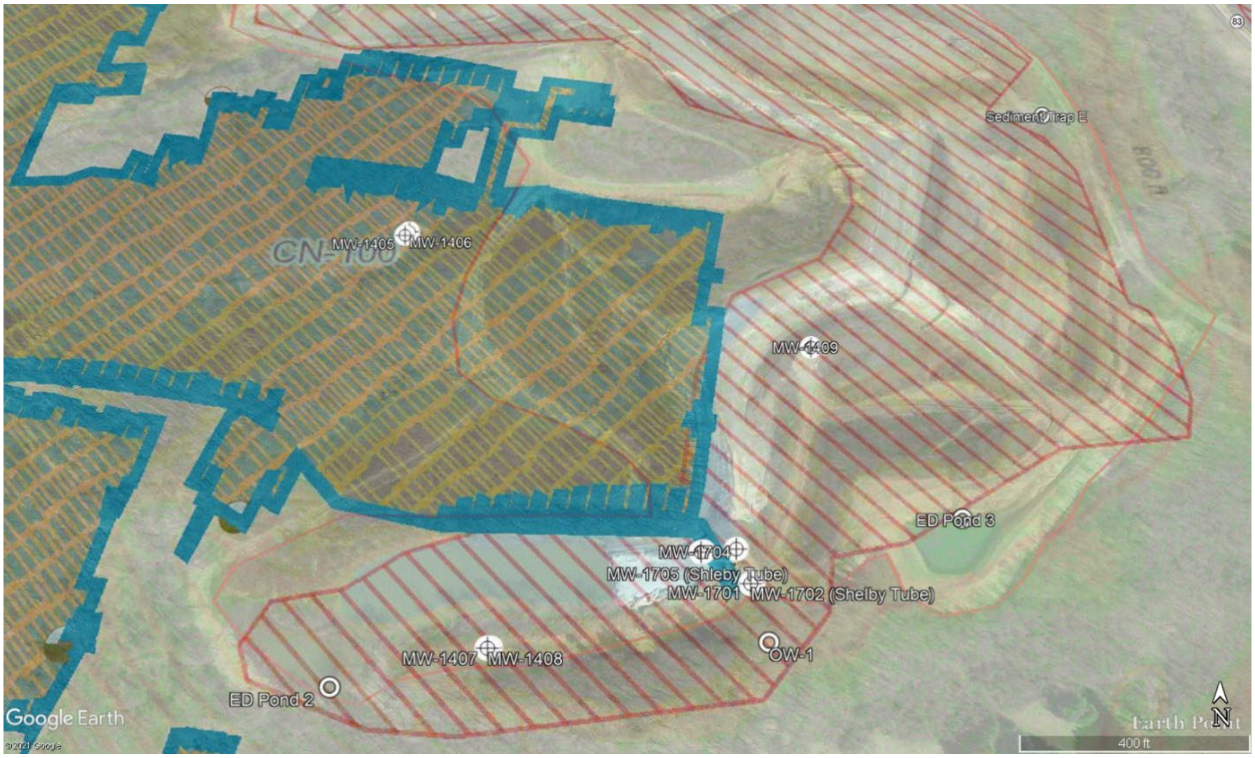

Figure 2-7. Overlaying map showing boundary of CN-100 abandoned underground mine in Phase 3 East area.

2.5.3 Surface Water

The temporal trends of TDS in the water samples collected from the eight (8) surface water monitoring locations are shown in **Figure 2-13**. During this period, the TDS levels in SW-1 (Oxford Pond), SW-3, and ED-3 remained stable. Only SW-04 showed an increasing trend. Both surface waters in the Phase 3 West area (WD-1 and WD-2) demonstrated a decreasing trend. ED-2 and OW-1 in the Phase 3 East area fluctuated significantly.

2.5.3.1 SW-3

SW-3 is a small tributary stream on the eastern edge of the project area that flows along County Route 429. The water quality of SW-3 measures the impact of reclamation on the background surface water for Phases 1, 2, and 3. It is, therefore, discussed separately from other phases and areas. As demonstrated in **Figure 2-13**, the concentration of TDS varied from 760-1600 mg/L, which is within the range observed in the past. There is no obvious decreasing or increasing trend. It appears that the water quality of SW-03 remained unchanged during this reporting period.

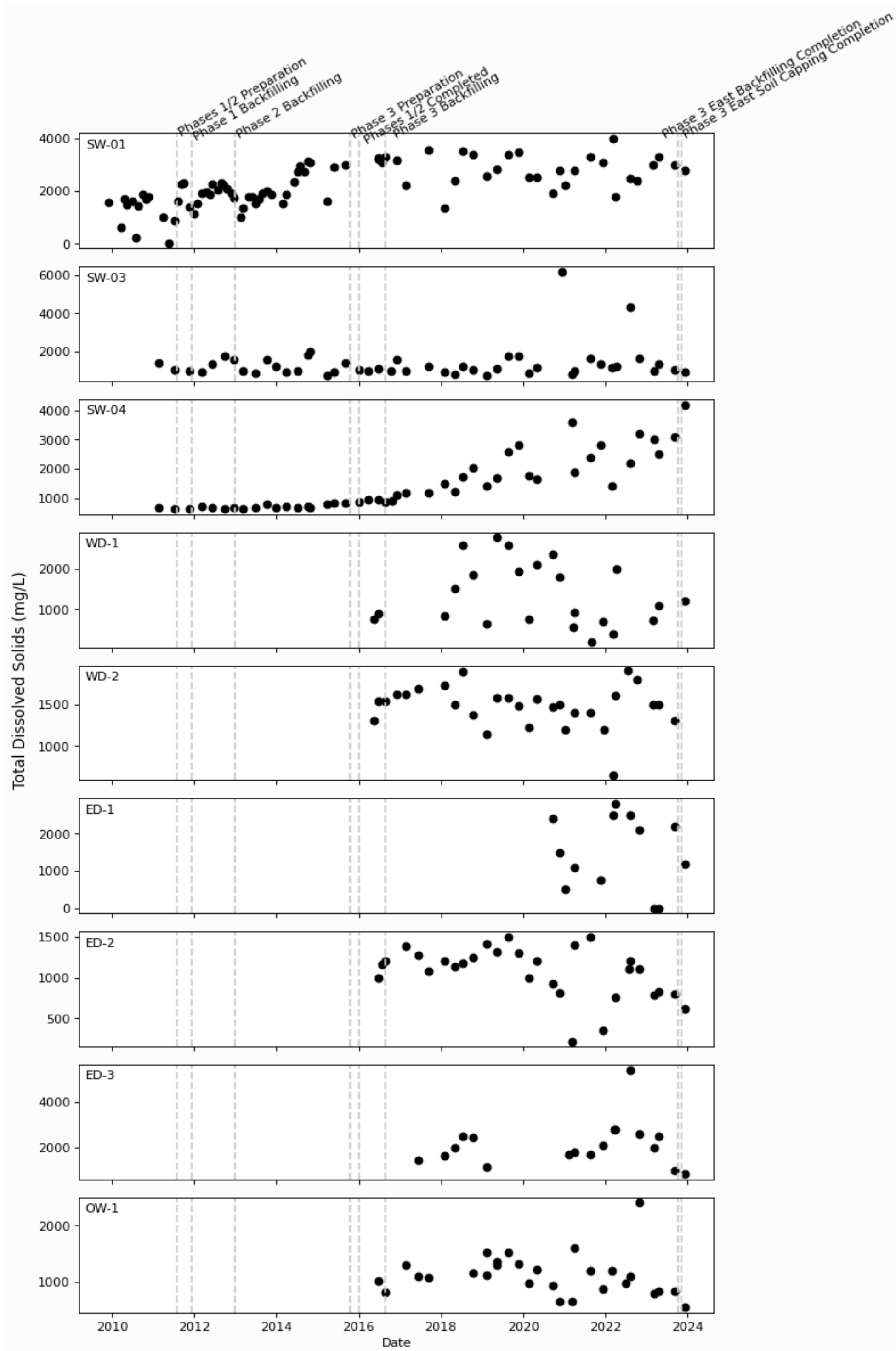

Figure 2-8. Temporal trends of total dissolved solids in the surface water bodies within and adjacent to the project area.

2.5.3.2 Phase 3 East

There are five (5) surface monitoring locations in the Phase 3 East area, i.e., OW-1, ED-1, ED-2, ED-3, and SW-4. Among these sampling locations, OW-1, ED-2, and SW-4 are associated with the Phase 3 East high wall pond pit that collected surface runoff and acid mine drainage seeping from the underground mine (CN-100) before it was drained and fully reclaimed (**Figure 2-12**). There has been no surface water discharge from ED-2 since September 2020. Water samples are dipped from the pond for analysis. The pH of the ED-2 pond has varied from 5.75 to 8.02 su for this reporting period. The pond's alkalinity increased notably in July 2022 and steadily increased during 2023 with a high value of 82 mg/l in September 2023 and may be coincident with closure and soil capping activities.

SW-4 is a perennial stream flowing southeast toward County Road 429, which combines surface runoffs, discharge from ED-2, and seepage from the mine spoil bank. ED-1 and ED-3 are sedimentation ponds located on the reclamation site's east side, capturing surface runoffs from Phases 2/3 (ED-1) and Phase 3 East (ED-3) areas. Water samples are collected from these locations only when water accumulates in the ponds. There has not been an observed discharge from ED-1, and no discharge has been recorded since 2019 for ED-3. Except for B, Na, and chloride, the water quality of ED-1 and ED-3 observed during this reporting period fluctuated within the ranges observed in the past and showed neither increasing nor decreasing trends (**Figure 2-14**). B, Na, and chloride concentrations showed decreasing trends during this reporting period. The remaining major ions may also be expected to decline with the completion of reclamation activities and the establishment of a healthy vegetative cover.

SW-4, ED-2, and OW-1: In 2023, the water quality of ED-2 and OW-1 closely trended with one another, significantly decreasing major and minor constituents as the reclamation proceeded to cap this area. The concentration of several parameters for SW-4 continued to increase during this reporting period for major constituents, such as chloride, sulfate, Ca, Mg, Na, B, Fe, and Mn **(Figure 2-14)**.

(a)

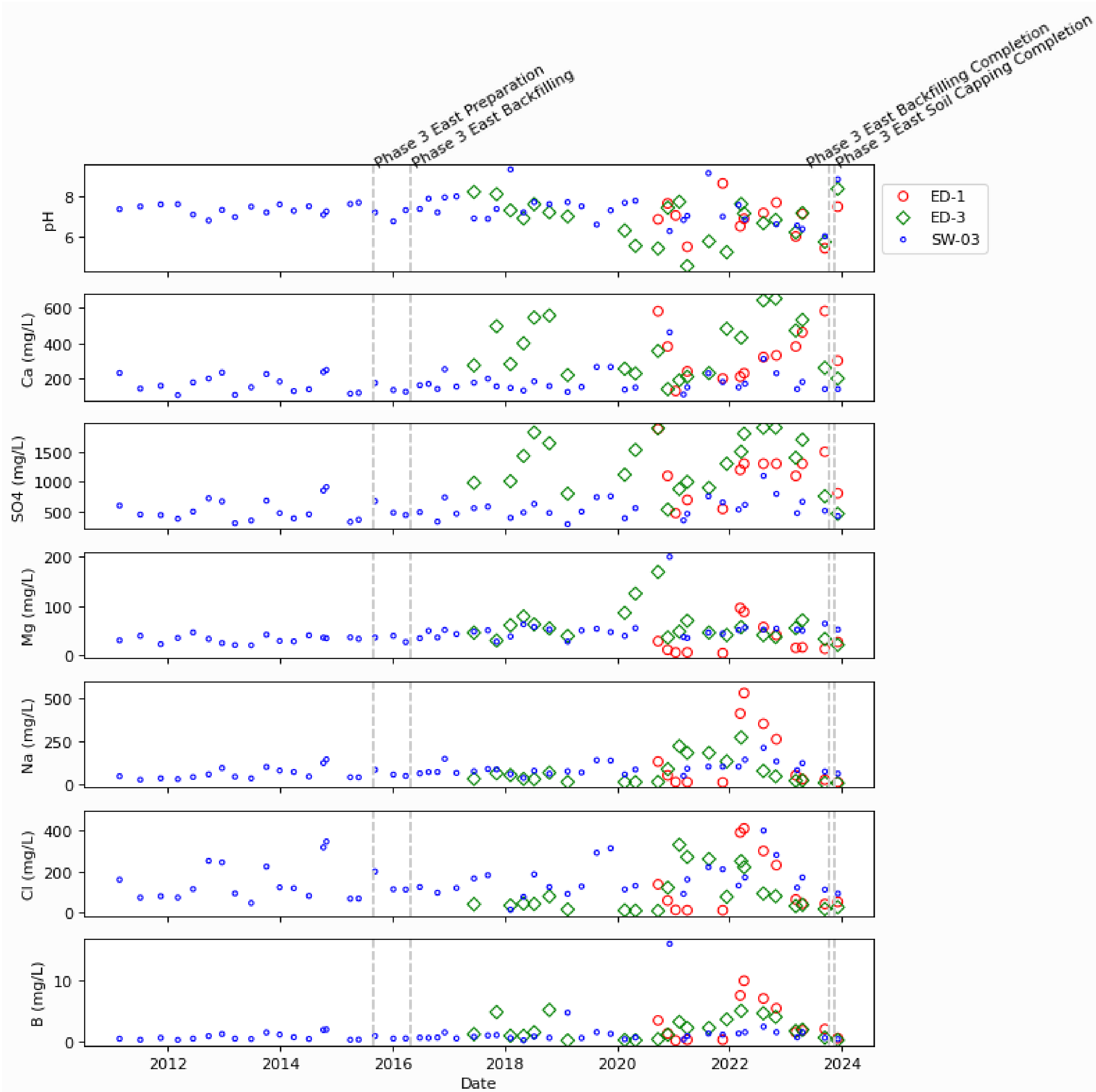

Figure 2-14. Temporal trends of major water quality parameters observed in ED-1, ED-3, and SW-3 that are significant in (a) and (b). Equivalent ratios of Ca to sulfate and Na to chloride are shown in (c).

(b)

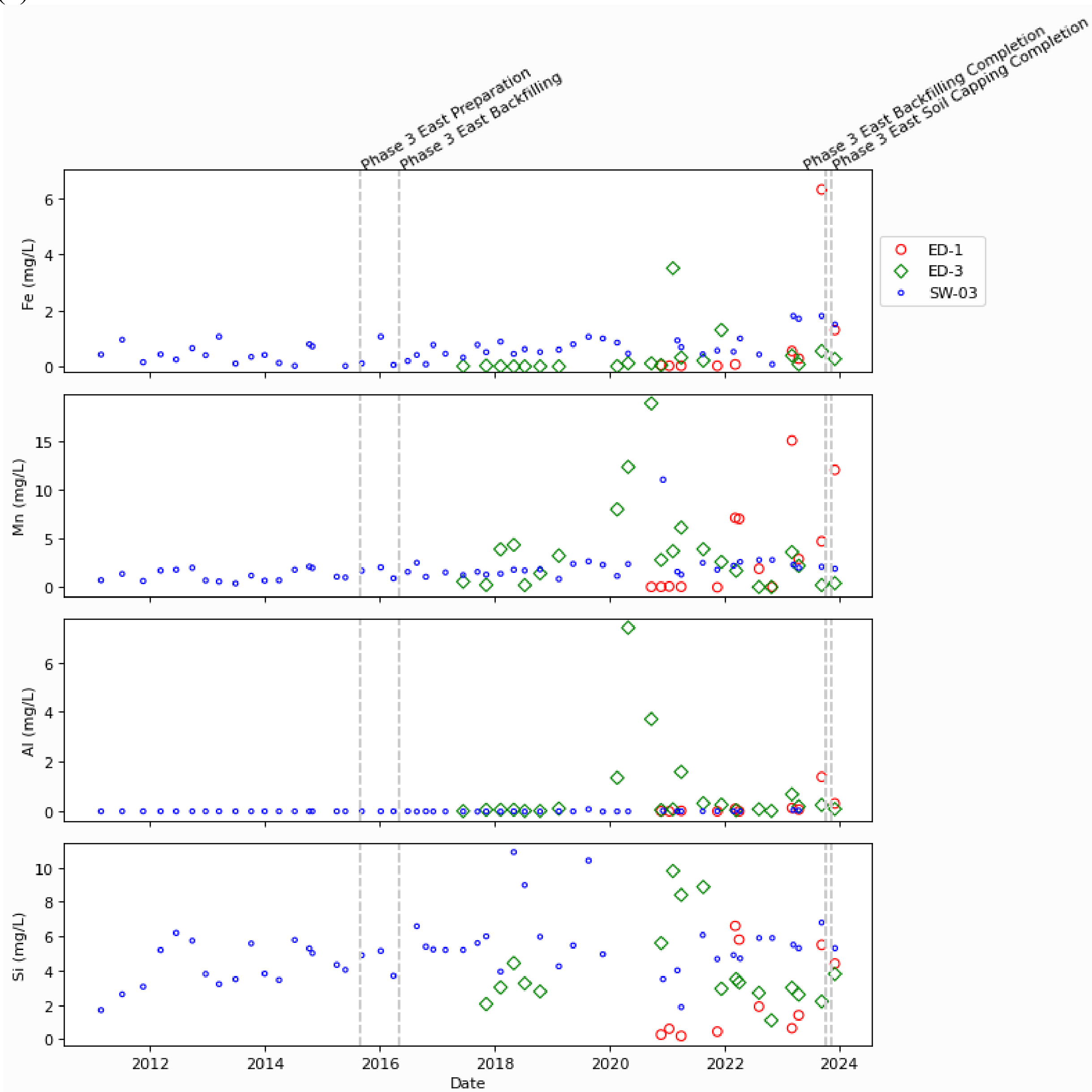

Figure 2-14. (cont'd) Temporal trends of major water quality parameters observed in ED-1, ED-3, and SW-3 that are significant. (a) and (b). Equivalent ratios of Ca to sulfate and Na to chloride are shown in (c).

(c)

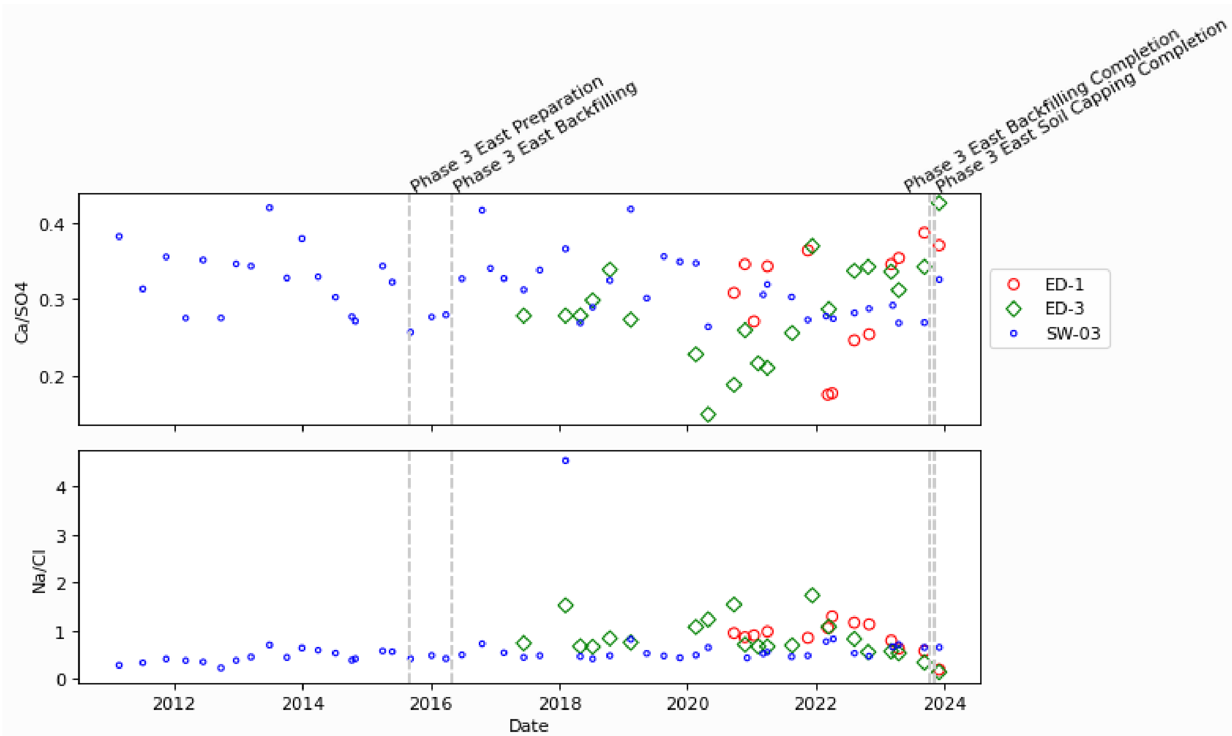

Figure 2-14. (cont'd) Temporal trends of major water quality parameters observed in ED-1, ED-3, and SW-3 that are significant. (a) and (b). Equivalent ratios of Ca to sulfate and Na to chloride are shown in (c).

The temporal trends of three equivalent ratios, i.e., Ca to sulfate, Na to chloride, and Ca to B, of the water samples collected from SW-4, ED-2, OW-1, and MW-1702 are shown in **Figure 2-15**. As shown in this figure, the chemical characteristics of OW-1 and ED-2 are similar. In addition, MW-1702 and SW-4 also trend very closely together, suggesting that the seepage from this area is dominating the water quality signature of SW-4, indicating the influence of the backfilled FGD materials on the surface water and groundwater of the area and discharge from the CN-100 mine works.

(a)

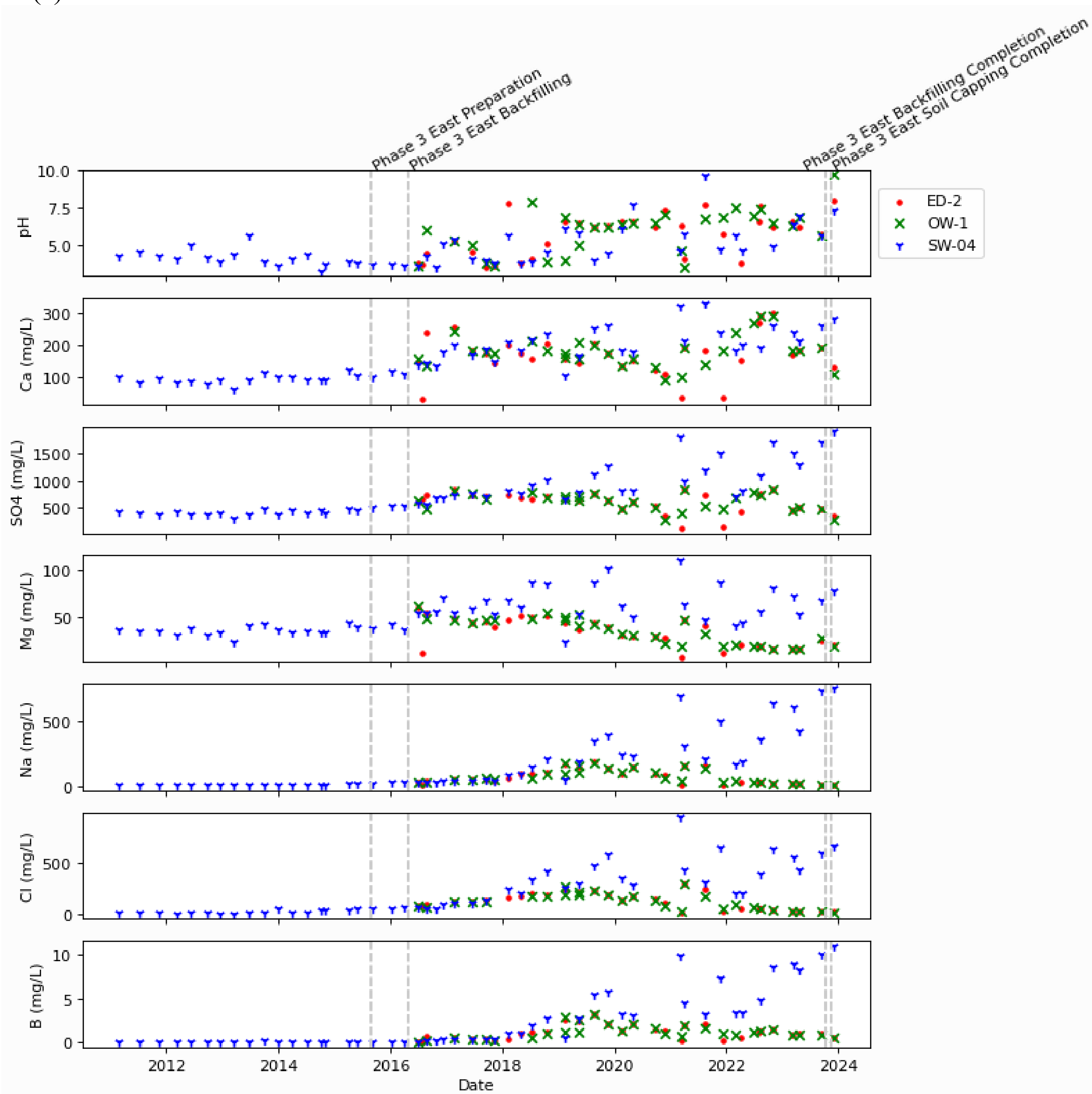

Figure 2-15. Temporal trends of major water quality parameters observed in ED-2, OW-1, and SW-4. Equivalent ratios of Ca to sulfate and Na to chloride are shown in (c).

(b)

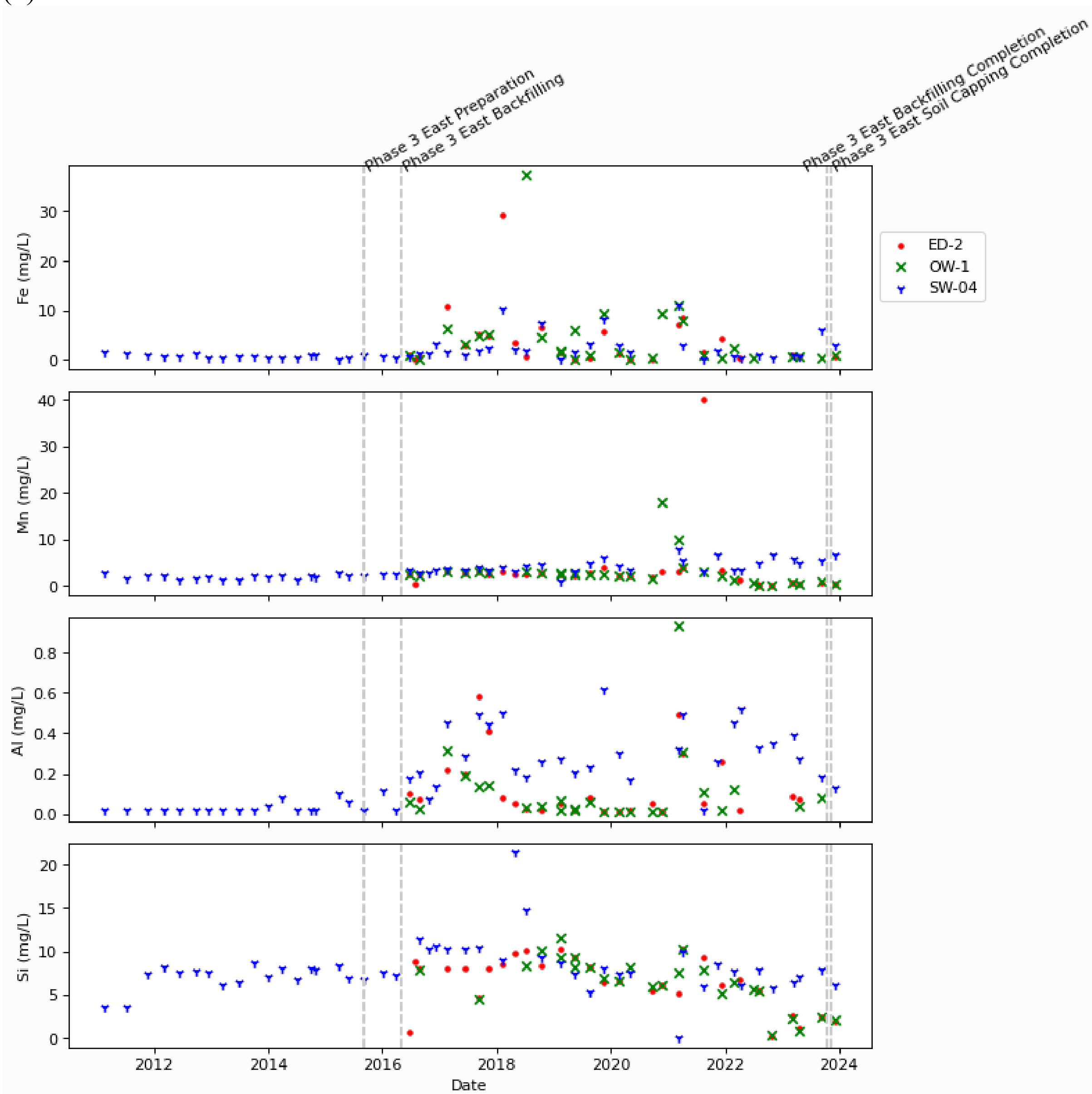

Figure 2-15. (cont'd) Temporal trends of major water quality parameters observed in ED-2, OW-1, and SW-4. Equivalent ratios of Ca to sulfate and Na to chloride are shown in (c).

(c)

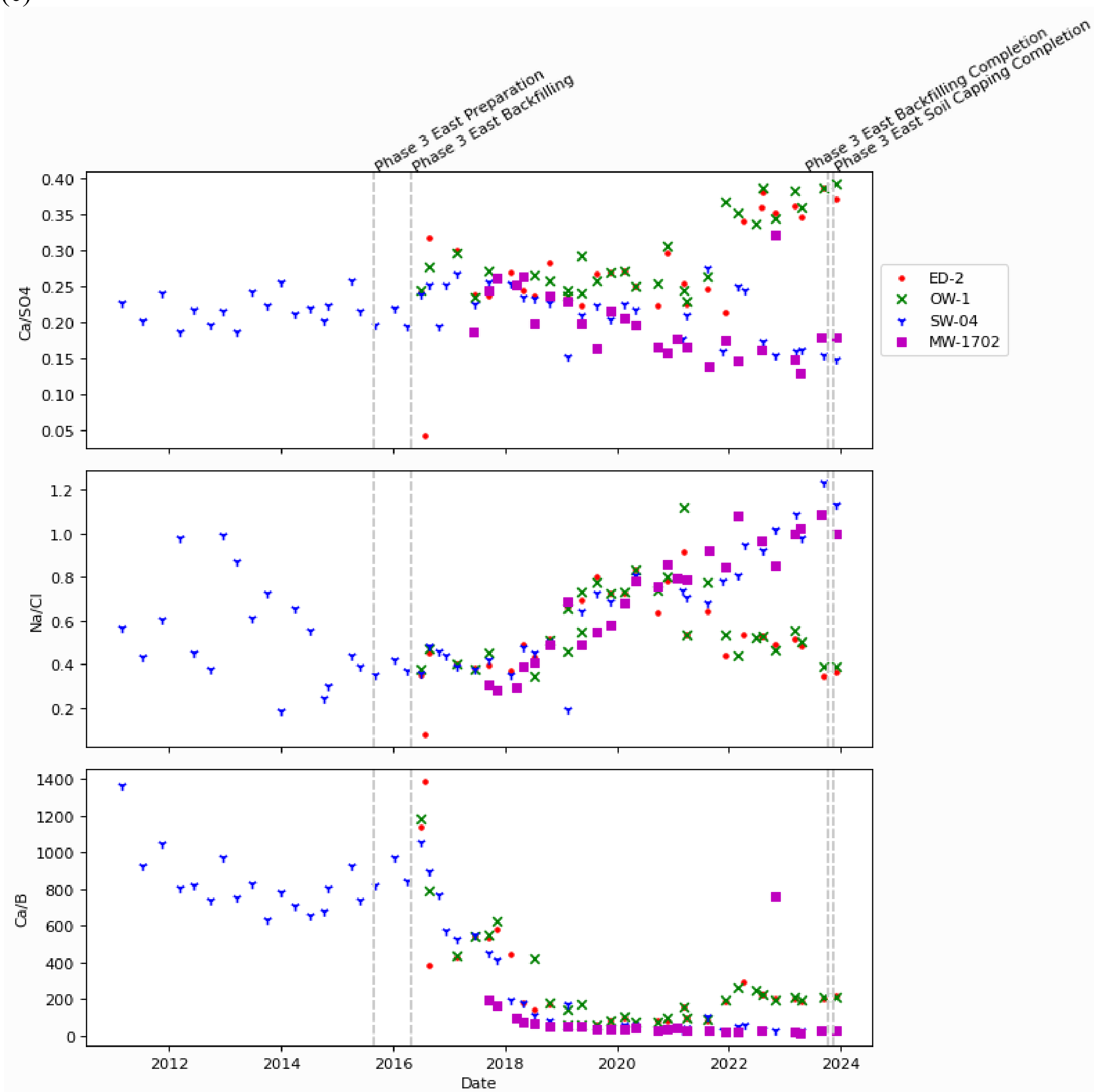

Figure 2-15. (cont'd) Temporal trends of equivalent ratios of Ca to sulfate, Na to chloride, and Ca to B for shallow groundwater monitoring well MW-1702 and surface waters in the east pit area.

2.5.3.3 Phase 3 West

SW-1 (Oxford Pond): The concentrations of TDS and major constituents in SW-1 (Oxford Pond) started increasing when the reclamation began and reached plateaus after the backfilling in the Phase 1 area was completed (**Figure 2-16**). No meaningful change in the water quality has occurred since the last reporting period. B, Na, and Cl concentrations, in general, have significantly increased after 2019 and may reflect the contact runoff from active reclamation within this area. As noted previously, with the completion of reclamation activities, these constituents may also be expected to decrease as a healthy vegetative cover is established over the coming years.

WD-1 and WD-2: WD-1 is the catchment of surface runoff from the Phase 3 west area and would discharge to WD-2. The water level in the WD-2 pond started decreasing shortly after the backfilling began and was drained after three months Both WD-1 and WD-2 have not discharged since April 2020. Sampling involves dipping into the pool (if the basin is not dry) and collecting the sample. The basin's water quality may substantially increase as water evaporates, thus concentrating remaining solutes or, conversely, becoming more dilute depending on ambient precipitation prior to sampling. These are not ideal sampling locations to monitor the influence of reclamation activities at the site.

(a)

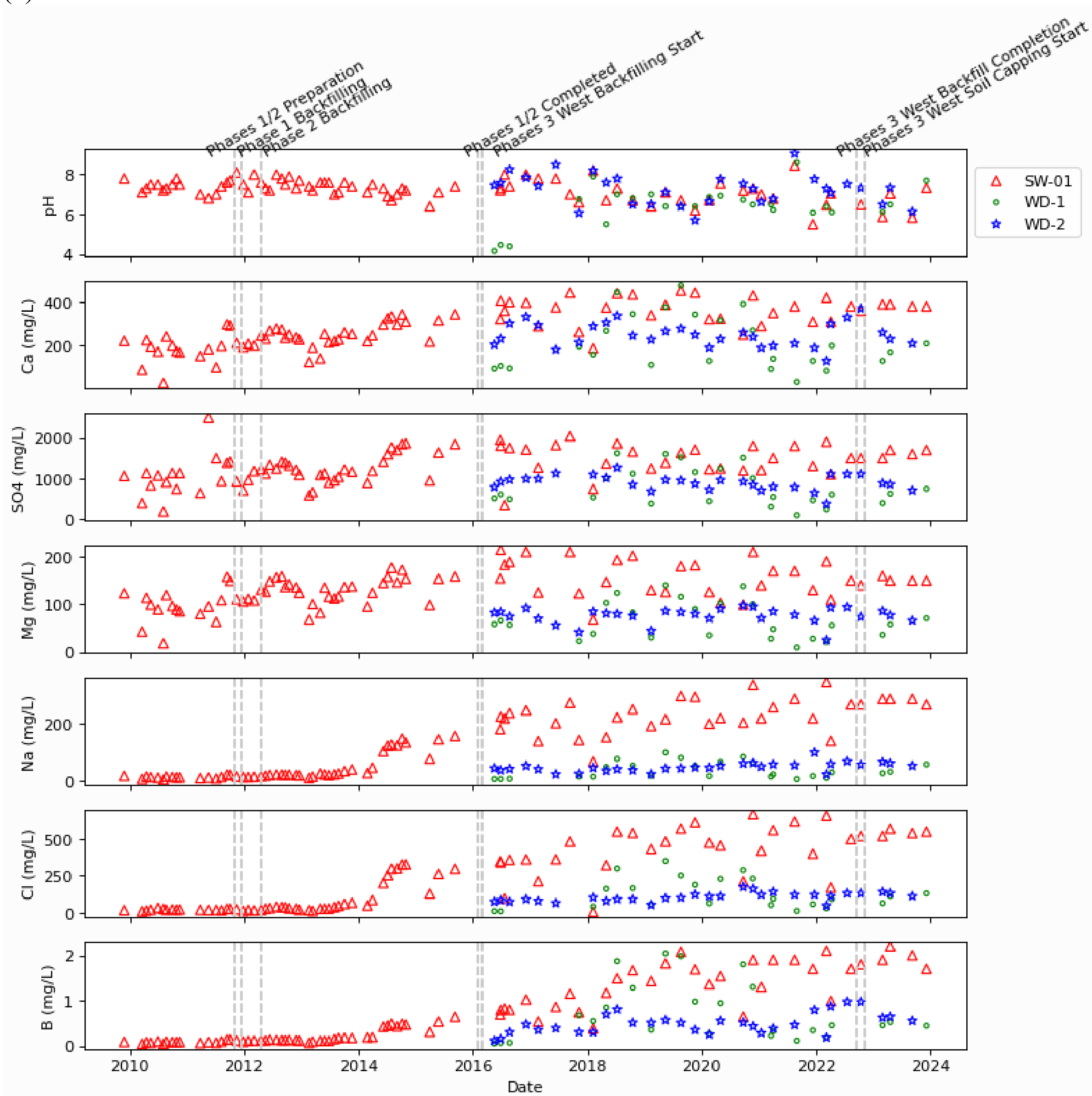

Figure 2-16. Temporal trends of major constituents and parameters in SW-1 (Oxford Pond), WD-1, and WD-2.

(b)

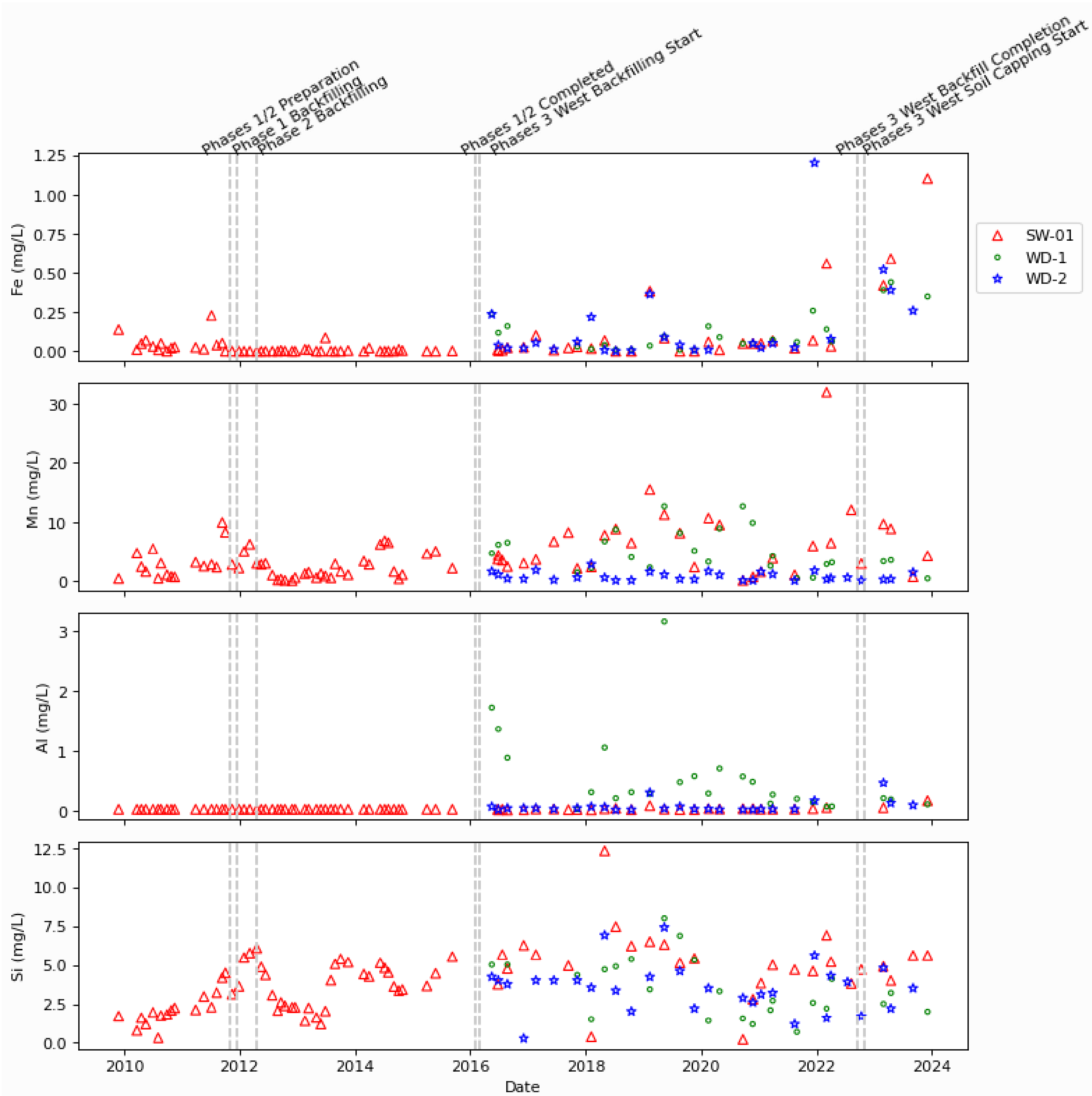

Figure 2-16 (contd.) Temporal trends of major constituents and parameters in SW-1 (Oxford Pond), WD-1, and WD-2.

(c)

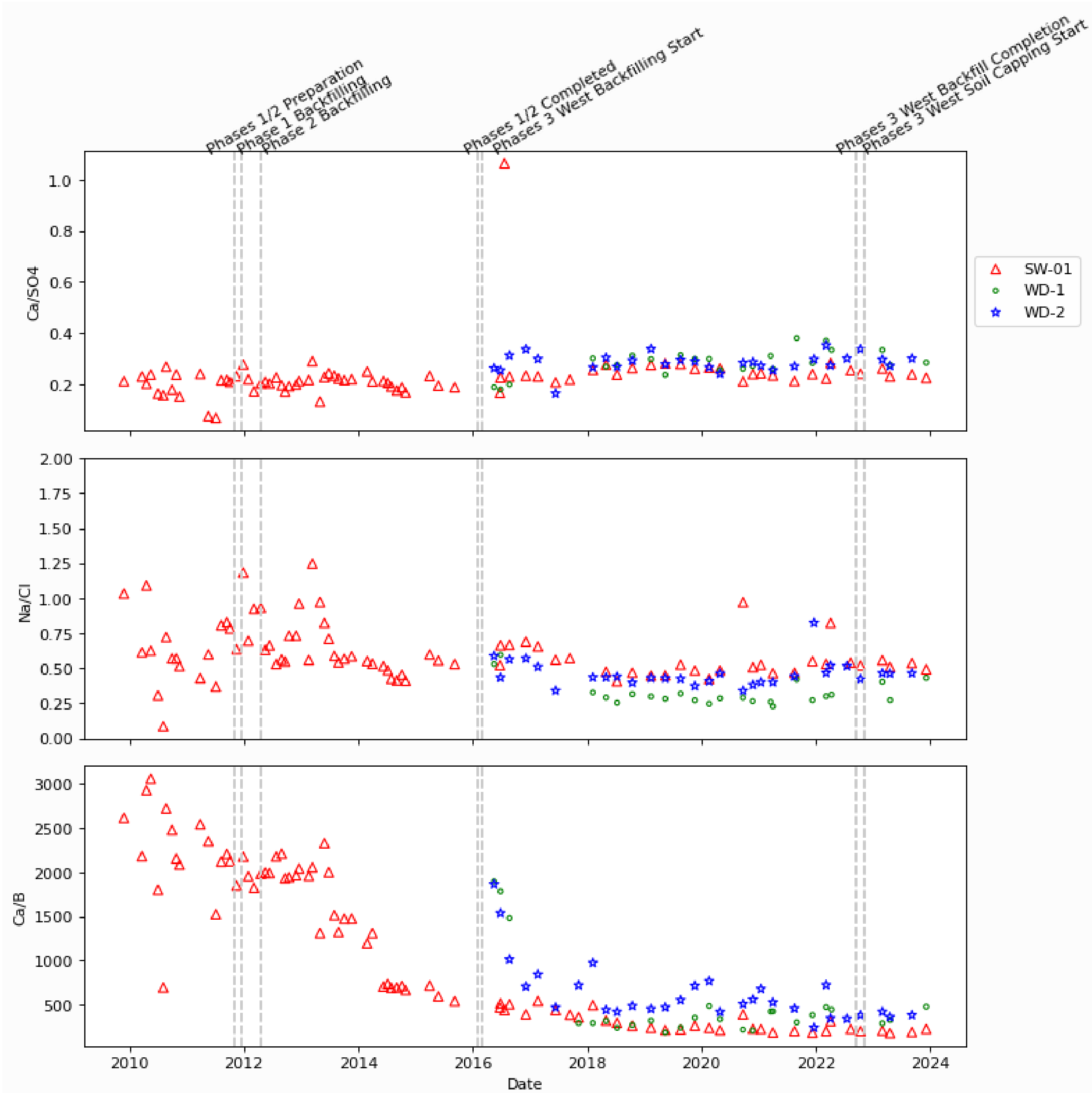

Figure 2-16 (contd.) Temporal trends of major constituents and parameters in SW-1 (Oxford Pond), WD-1, and WD-2.

2.6 Environmental Implications

Select constituents (Na, Cl, Cu, B, and TDS) measured in the surface water sampling locations SW-03 and SW-04 are plotted compared to the potential ecological impact threshold values (Figure **2-17**). The background concentrations of Na, Cl, B, and TDS measured before Phase III Preparation occurred in late 2015 are also shown. As noted previously, there are clear trends at SW-04 of increasing Na, Cl, B, and TDS after Phase III Backfilling begins. This is also evident when comparing results to those for SW-03, an upstream sampling location. Variations in Na, Cl, B, and TDS concentrations in SW-04 exhibit much greater variability when compared to pre-reclamation values, suggesting variations in input, flow, or both. Maximum values for Na, B, and TDS were recorded in the 2023 sampling. Preliminary analyses of leaching site material under a simulated rainfall scenario using laboratory columns (data not shown) show rapid initial release of soluble constituents (e.g. Na, Cl, Ca). Concentrations of these constituents were observed to decrease quickly overextended leaching time. The trends of Na and Cl from monitoring well MW-1702 show increased concentration after reclamation begins that is continuing to rise for five years (**Figure 2-14**).

The benchmarks presented in **Figure 2-17** and **Table 2-4** for Cl, Cu, and B were those referenced in U.S. EPA National Recommended Aquatic Life Criteria (2022) and Human and Ecological Risk Assessment of Coal Combustion Residuals (2014). The U.S. EPA does not have aquatic life criteria for Na or TDS however, a typical value for TDS in freshwater is less than 500 mg/L (Moran, 2018). Recent observations of TDS in SW-04 are 4,200 mg/L, an increase of ~ 1,000 mg/L since last year. Recent concentrations of Na at SW-04 are 95 times greater than values before reclamation. Concentrations of copper stay below the ecological risk benchmark, but those for Cl and B do not and show a clear increase above the threshold after reclamation began. Because of the variability of the results, more analyses and possibly sampling of SW-04 are needed to determine better their potential to cause ecological impacts.

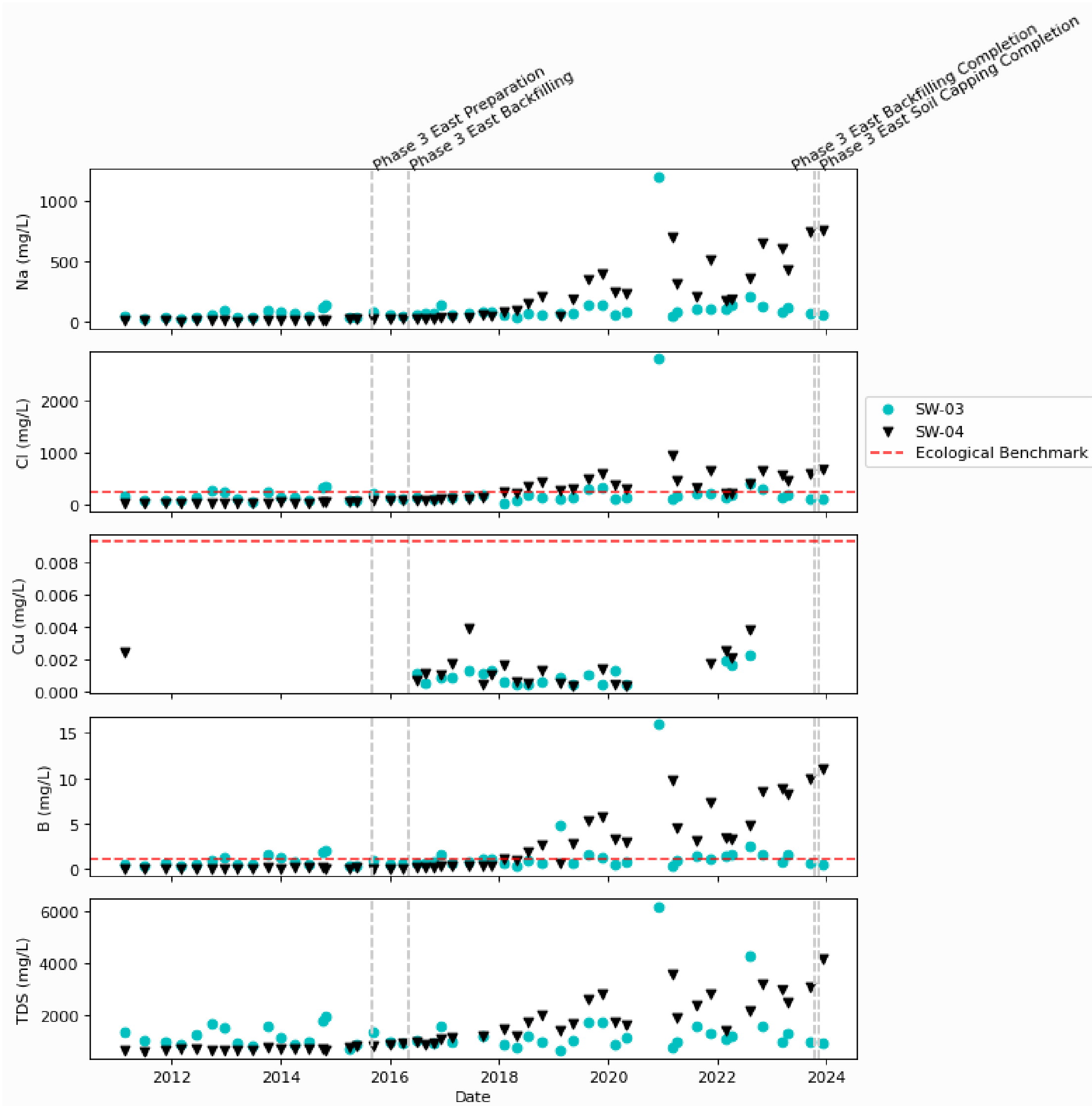

Figure 2-17. SW-04 and SW-03 where SW-04 is the receiving stream of reclamation discharge and SW-03 is a stream monitored for baseline concentrations. Na, Cl, Cu, B, and TDS are shown for both streams. General trends show increasing concentrations that exceed ecological benchmark values of Cl and B (Table 5-4).

Table 2-4. Ecological Benchmark Values

Constituent	Benchmark (mg/L)	Source
Chloride	230	U.S. EPA National Recommended Aquatic Life Criteria
Copper	0.0093	US EPA, 2014
Boron	1.1	US EPA, 2014

(Chloride, Copper, and Boron ecological benchmark values used in Figure 5-19 and sourced from either U.S. EPA National Recommended Aquatic Life Criteria or Human and Ecological Risk Assessment of Coal Combustion Residuals, US EPA, 2014.)

All the arsenic exceedances occur in the groundwater samples collected from the deep Clarion aquifer (i.e., MW-1408). Monitoring well MW-1407 As increased from the prior reporting period but is consistent with the recent trend overall. The other arsenic exceedances occur in the surface water samples collected from ED 1 and ED 3. The concentration of As in MW-1408 has increased in the past year, returning to pre-reclamation levels. The As concentrations in the deep Clarion aquifer reflect naturally occurring background levels.

In MW-1407, the As concentration levels plateaued around the US EPA MCL value of 0.01 mg/l. As demonstrated in **Figure 2-5**, there was a general increasing trend of As since the monitoring began in 2015. As noted earlier, the concentrations of chloride and sulfate in MW-1407 have demonstrated a recent increase, while that for the other major constituents remained relatively constant during this time span. The increasing As concentration is believed to have resulted from the previous flooding and exposure of pyritic shales and coal fragments in the mine spoil bank (**Figure 2-18**) near the well site.

Figure 2-18. The presence of the cut into the interior slope of the mine spoil bank shows new exposure of black shales/coal fragments in the vicinity of MW-1407 & MW 1408. Photo date is November 16, 2021.

Concentrations of As also spiked in 2023 for MW-1507s, with a corresponding spike of Fe concentrations. As noted above, this may reflect the oxidation and subsequent solution of sulfides contained in the sandy mine spoil cover cap layer.

Figure 2-19 shows As concentrations for the source characterization well, MW-1705, and corresponding downgradient monitoring wells, MW-1703 and MW-1702. Concentrations of As do not persist above the drinking water MCL but exhibit several intermittent high points. These same trends are reflected but considerably subdued in the closest downgradient monitoring well, MW-1703. Monitoring well MW-1702 is the next closest downgradient monitoring well and As concentrations have not exceeded the MCL of 0.01 mg/l.

The highest total As concentration observed in this reporting period is 0.95 mg/L, observed in the water sample collected from ED-1 in September 2023. Concentrations of As in ED-1 shows an increasing trend, with all values since April 2022 being greater than 0.01 mg/L

(US EPA MCL). Considering the fluctuations' magnitudes, the sources of high As in this sedimentation pond were likely due to untraceable sampling and/or analytical influences. Currently, no clear indication shows that the backfilled material has caused the observed exceedance of As MCL.

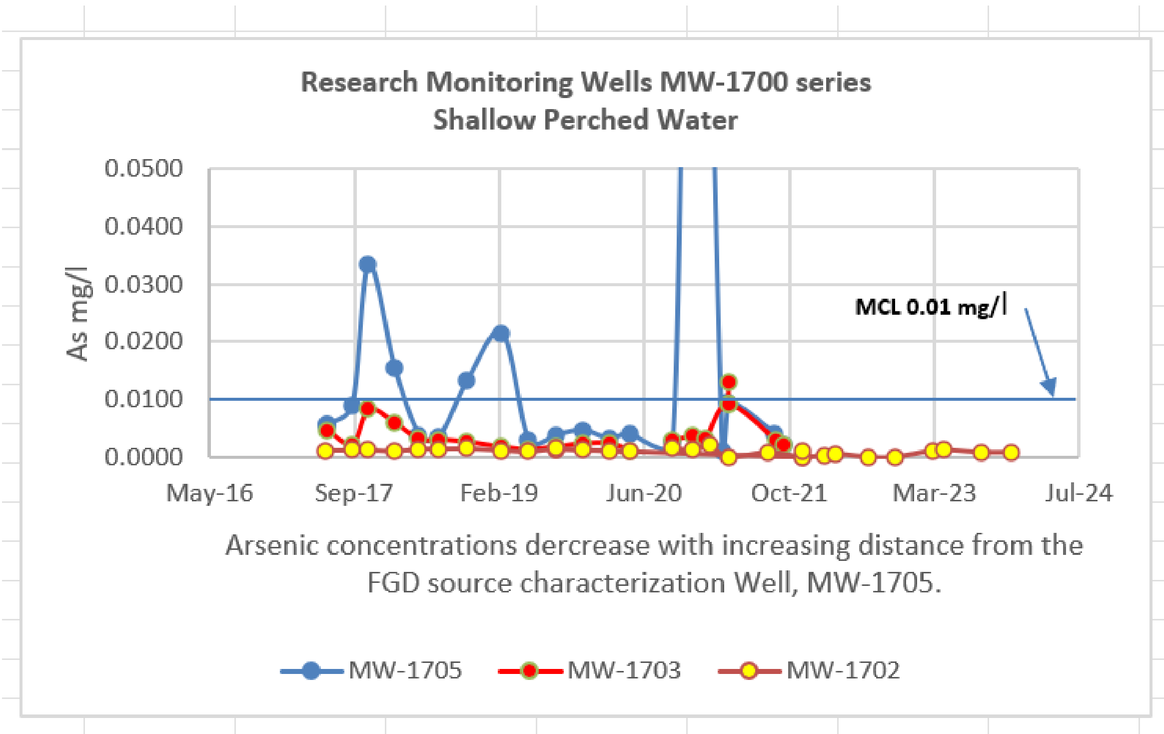

Figure 2-19 MW-1702, MW-1703 & MW-1705 As concentrations

Chapter 3: Laboratory Testing & Risk Analysis

3.1 Laboratory Testing

3.1.1 Environmental Characterization

3.1.1.1 Characterization of Conesville sFGD and FA

Samples of fly ash and stabilized FGD material collected quarterly were characterized to determine the elemental composition, mineral composition, and potential to leach hazardous elements. These analyses were conducted to support the risk assessment analyses presented later in this Chapter.

The elemental composition of the sFGD and FA material was analyzed per EPA method 3052 with a microwave-assisted heating method. Analyses of the digested samples were conducted using inductively coupled plasma optical emission spectroscopy (ICP-OES, Agilent 5100). The mineral composition of the materials was analyzed using a Malvern PANalytical X'Pert Pro X-ray powder diffractometer employing CuKa radiation at 40kV and 20mA. Step-scanned data were collected from 5 to 70° 2q with a fixed time of 2 seconds per 0.02° 2q. All data were analyzed using semi-quantitative data reduction software (Jade Pro, Materials Data Inc.).

3.1.1.2 Column Leaching Test Methodology

A flow-through column leaching method per USEPA Method 1314 estimated the release of constituents from sFGD and FA material as a function of the liquid-to-solid (L/S) ratio under different percolation conditions. This method provides a leaching process closer to the scenario of using the materials for AML reclamation and CMD mitigation. The L/S ratio represents the cumulative volume of contacting solution, or eluent, passing through the column containing a known amount of sFGD or FA material.

The column tests used two 30-cm vertical acrylic vessels with an inner diameter of 5 cm (**Figure 3-1**). Approximately 1 cm of silica sand, used to distribute eluent flow, was placed at the bottom of the column before the sFGD material was packed. Approximately 300 g of dry sFGD or FA was then moderately packed in the column. A layer of silica sand was placed on the packed FGD or FA material to form a coarse filter for particulates. Before use, the silica sand was soaked in a 5% nitric acid for three days and thoroughly rinsed with deionized water.

The column tests were carried out in parallel by introducing eluent (dilute H_2SO_4/HNO_3 acid; pH of 3.5 +/- 0.5) into the columns in an up-flow mode. The setup allowed each column packing to be completely wetted. The pump was stopped when the eluent level in the column was even with the top of the column. The eluent-saturated column was equilibrated for 24 hours before the water flow was resumed. A collection schedule was established to collect a series of eluate fractions on roughly a 24-hour basis for ten days.

During each sampling interval, the eluate was collected in 500 mL HDPE bottles, and the pH (Orion Ross), conductivity (Orion DuraProbe), and redox potential (Orion Epoxy Triode) were measured. A new collection bottle was then used to collect the next fraction of the eluate. Portions of each collected sample were prepared for analyses by ICP-OES. Arsenic and selenium were measured using graphite furnace atomic absorption spectroscopy (Agilent Series 200). The flow rate was maintained at 1.1±0.2 L/S per day using a peristaltic pump (FH100M of Thermo Fisher Scientific).

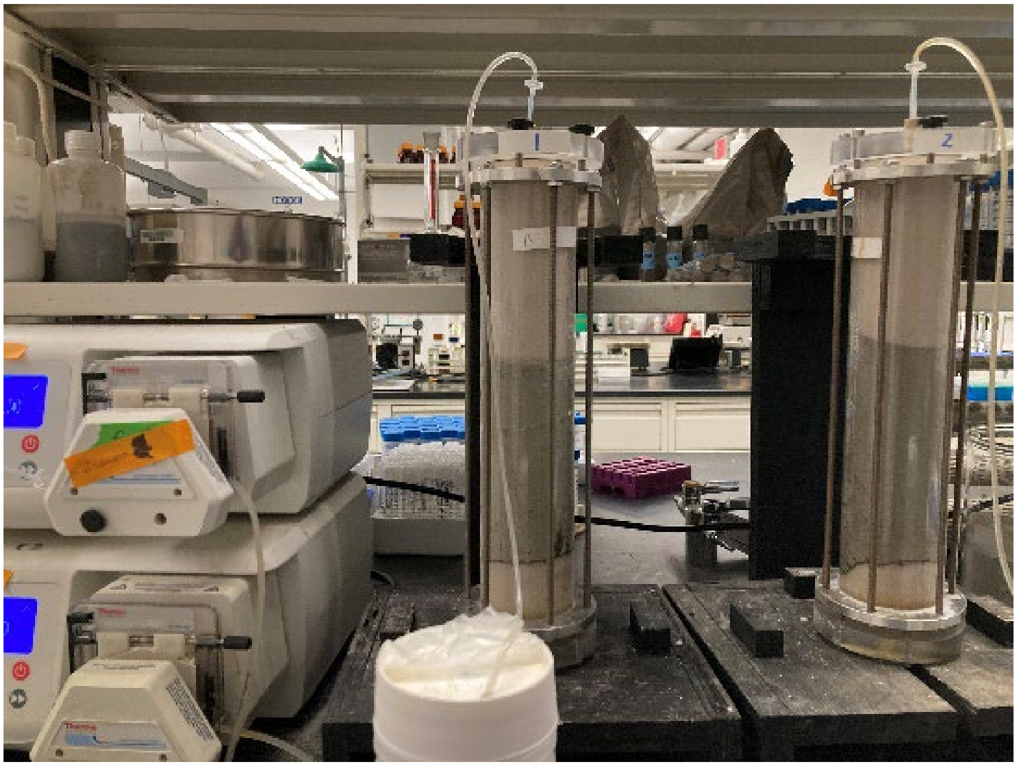

Figure 3-1 Setup of column leaching test

<u>3.1.1.3 Results</u>

Characterization of fly ash and sFGD: The chemical composition of the fly ash was dominated by Al, Fe, and Si, whereas that of the sFGD material was dominated by Ca, S, Si, and Fe (**Table 3-1 and 3-2**), consistent with the origin of these materials during the combustion of coal. Variations in elemental composition were high, possibly reflecting the variation in sample weathering based on the location from which it was recovered. Based upon an auto-Rietveld analysis of the X-ray diffraction results, the primary mineral phases for sFGD were hannebachite ($CaSO_3 \cdot 0.5H_2O$), gypsum ($CaSO_4$), ettringite ($Ca_6Al_2(SO_4)_3(OH)_{12} \cdot 26H_2O$), and calcite ($CaCO_3$). Quartz was also measured, but overlapping peaks with other phases hindered its determination in the analyses. Overall, these phases were consistent with elemental composition showing high proportions of Ca, Si, and S. The major minerals present in fly ash were quartz (SiO_2), mullite ($3Al_2O_3 \cdot 2SiO_2$), magnetite (FeO), and hematite (Fe_2O_3). Calcite was also present. The volume percentages of these phases were not determined as the auto-Rietveld analyses were not applied to these samples.

Table 3-1. Average elemental composition of Conesville fly ash and sFGD materials.

Element	Mean Concentration (mg/g)	
	Fly Ash	Stabilized FGD
Ag	0.0002 ± 0.0003	0 ± 0
Al	32 ± 17	2.8 ± 0.8
As	0.13 ± 0.05	0.060 ± 0.015
B	0.42 ± 0.13	0.62 ± 0.11
Ba	0.21 ± 0.08	0.023 ± 0.005
Be	0.015 ± 0.006	0.0010 ± 0.0011
Ca	0.59 ± 0.18	11 ± 4
Cd	0.0034 ± 0.0013	0.0006 ± 0.0005
Co	0.034 ± 0.009	0.011 ± 0.002
Cr	0.10 ± 0.03	0.026 ± 0.007
Cu	0.103 ± 0.014	0.034 ± 0.003
Fe	79 ± 30	30 ± 8
K	9 ± 2	4.1 ± 0.8
Li	0.094 ± 0.014	0.022 ± 0.004
Mg	0.2 ± 0.2	0.36 ± 0.07
Mn	0.30 ± 0.07	0.12 ± 0.03
Mo	0.002 ± 0.003	0.002 ± 0.002
Na	0.6 ± 0.2	0.45 ± 0.14
Ni	0.102 ± 0.017	0.037 ± 0.006
P	1.01 ± 0.16	0.30 ± 0.08
Pb	0.06 ± 0.02	0.019 ± 0.006
S	1.6 ± 1.0	78 ± 22
Se	0.003 ± 0.005	0.001 ± 0.002
Si	159 ± 17	64 ± 14
Sn	0.07 ± 0.06	0.005 ± 0.004
Sr	0.051 ± 0.015	0.039 ± 0.006
Ti	4.2 ± 1.1	1.5 ± 0.4
Tl	0.0092 ± 0.0008	0 ± 0
V	0.21 ± 0.05	0.059 ± 0.012
Zn	0.23 ± 0.03	0.08 ± 0.02

Table 3-2. Average mineral content of sFGD material.

Mineral	**Volume Percent**
Hannebachite	53 ± 28
Gypsum	23 ± 24
Ettringite	7 ± 4
Calcite	8 ± 5
Other (Quartz)	9 ± 9

Column-scale leaching results: Eluate from the sFGD leaching tests was dominated by Ca and S (**Figure 3-2)**, which released concentrations in the 100's of mg/L over the entire test duration. Potassium and sodium had slightly lower concentrations (data not shown). Of the remaining elements, only As, Se and B were released at concentrations that presented either human health or an ecological health risk (**Figure 3-3**). Except for at low L/S ratios, the pH of the eluate was consistently at a circumneutral value (**Figure 3-3**). Additional details of the leaching results are discussed in the context of the risk assessment in later sections of this chapter.

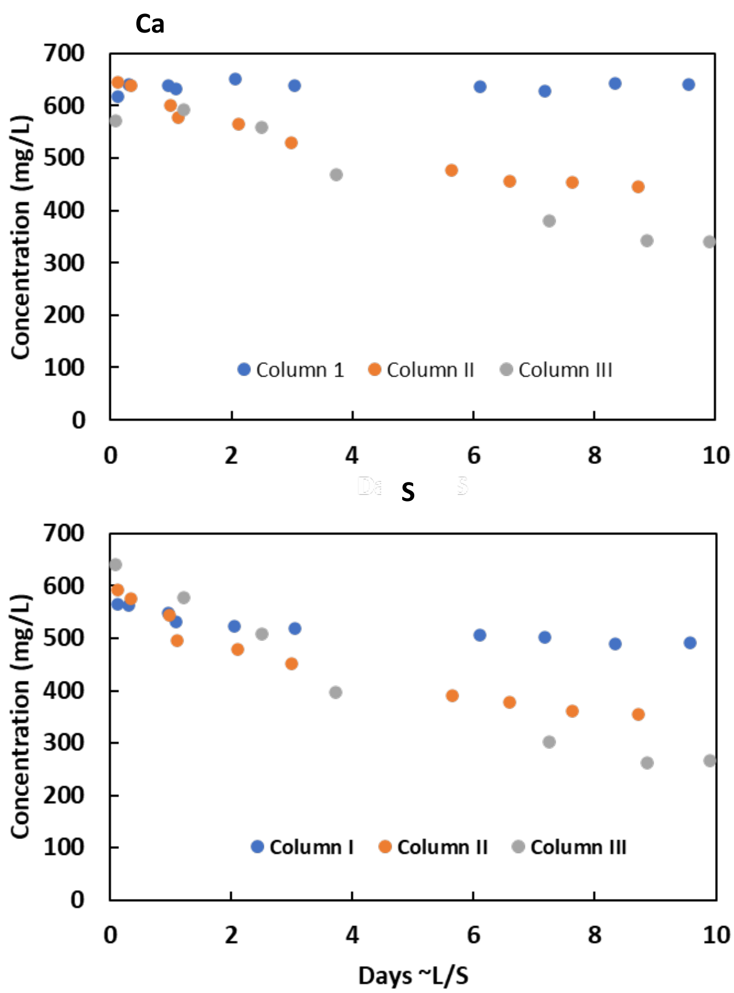

Figure 3-2. Eluate concentrations of Ca and S for select column leaching tests of the Conesville sFGD material.

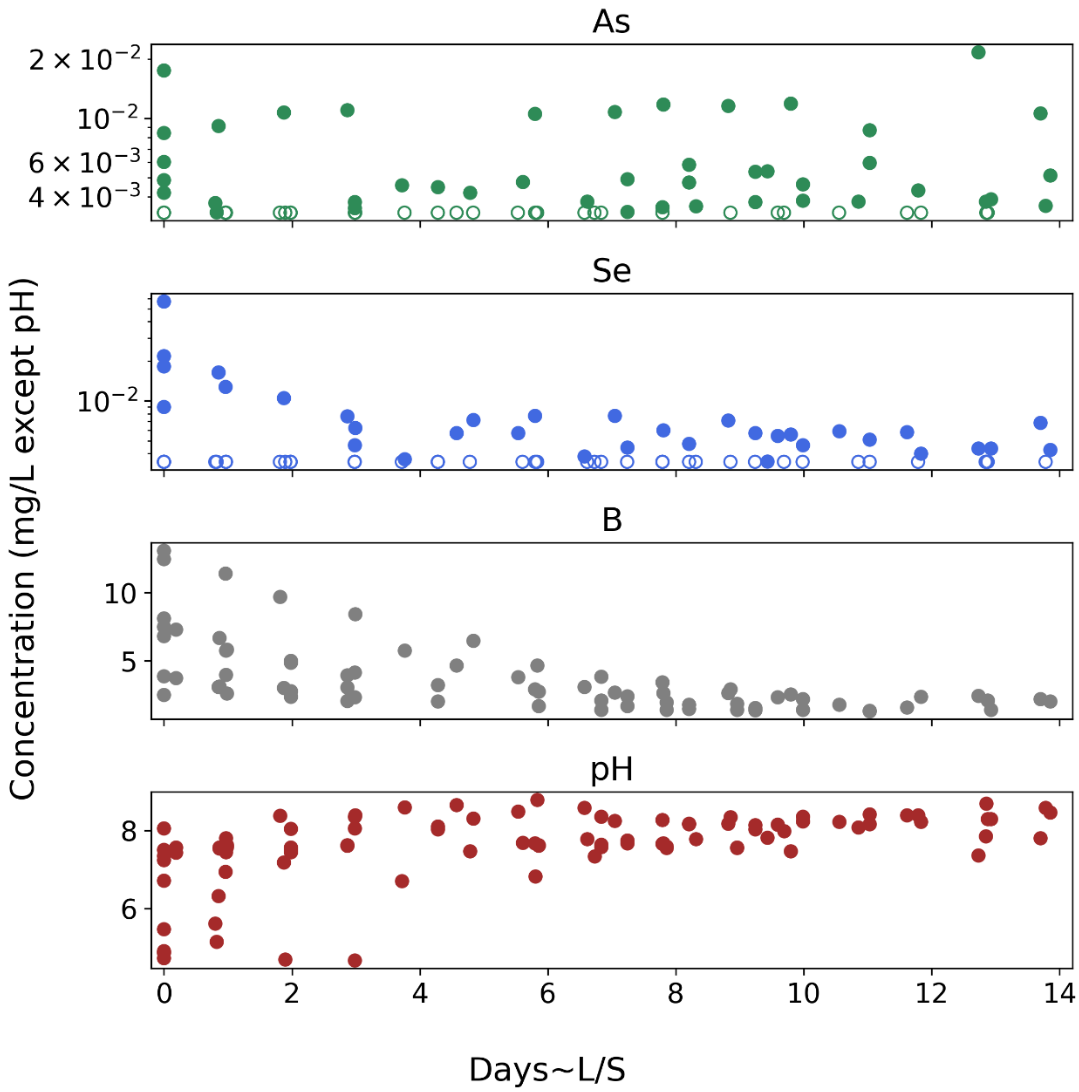

Figure 3-3. Eluate pH and B, Se, and As B concentrations for column leaching tests of the Conesville sFGD material. Open symbols represent sample analyses that were below instrument detection limits. One day is approximately equal to one L/S ratio.

3.1.2 Geotechnical Characterization

Geotechnical Testing Services (GTS) collected and received samples of ponded fly ash and in-place sFGD material in the on-site landfill FGD for testing on a quarterly basis. GTS also sent and received samples of the limestone FGD.

Samples were analyzed for engineering properties, including gradation analyses, standard Proctor compaction testing, shear strength, and permeability testing. A summary of the testing conducted to date is included in Appendix A. A review of these data shows no significant change in the geotechnical properties of the CCR materials placed at the site.

3.2 Risk Analysis

In this section, we discuss the efforts of modeling fate transport and geochemical reactions, sensitivity analysis, model calibration and validation, and human health and ecological risk evaluation. The results of the geochemical model and statistical risk analysis are detailed in this section.

3.2.1 Summary

This research applied statistical methods to characterize the human and ecological health risks of CCR leachate in the environment. The site water quality and experimental leachate data were evaluated with parametric bootstrapping and used to develop and calibrate a geochemical reactive fate and transport model. First, we identified the species of concern from the results of the column and synthetic precipitation leaching procedure (SPLP) experiments. These species were identified by incorporating censored data in our parametric bootstrapped mean analysis. The results delineated the distribution of the expected leachate composition. To identify the species of concern that leach from the CCR used in the Conesville reclamation, we calculated the non-cancer hazard quotient (HQ), the risk due to a carcinogen (C_{risk}), ecological hazard quotient (HQ_{eco}), and compared concentrations to the US EPA max contaminant level (MCL) for drinking water. Species exceeding these thresholds were targeted for geochemical modeling. The geochemical model, resembling Phase III East, predicts future concentrations of these species in shallow groundwater. The geochemical model is calibrated with Bayesian Inversion, a technique that produces a range of likely uncertain input parameters. Our results indicate the potential for Se and B to leach from stabilized flue gas desulfurization (sFGD) above the chronic aquatic health criteria and As to pose increased cancer risk in a lab setting. However, in a field application, we do not observe elevated risk of As and Se to human or ecological systems. At the site in Conesville, OH, B poses a risk to ecological systems and may be sourced from the CCRs placed in the abandoned mine land (AML), alterations in groundwater flow, or other site minerals.

3.2.2 Review of Risk Assessment

CCRs have the potential to leach trace elements, such as As, Se, and B, above human and ecological health limits (Deonarine, Schwartz, and Ruhl 2023; US EPA 2023; Weinberg et al. 2022; Jin et al. 2023; Kravchenko and Ruhl 2021; Izquierdo and Querol 2012). The mobilization of these elements from CCRs is variable and site-specific. In CCRs, As and Se are typically associated with calcium-bearing mineral phases, adsorbed to iron-oxides, or both (Deonarine, Schwartz, and Ruhl 2023; X. Wang et al. 2022; Al-Abed et al. 2008). Highly soluble B leaches readily from the surfaces of CCR particles (Izquierdo and Querol 2012; X. Wang et al. 2022) and may be used to trace the extent of CCR leachate migration in the environment (Ruhl et al. 2010). Given the variability of trace element content in CCRs, site-specific risk assessments are imperative to understand the impacts of beneficially reused CCRs (Deonarine, Schwartz, and Ruhl 2023). Direct analysis of risk from CCR leachate is explored with leaching experiments and groundwater monitoring (Petrović and Fiket 2022; US EPA 2015).

Elucidating the mechanisms governing As, Se, and B mobilization from CCRs has been explored with statistical (Jin et al. 2023) and geochemical models (X. Wang et al. 2022; Zhang, Branam, and Olyphant 2017). FGD materials applied to AML reclamation are suspected for increasing concentrations of As and B in interstitial and groundwaters (Zhang, Branam, and Olyphant 2017; Haefner 2002). However, understanding the mechanisms mobilizing these elements from FGD materials is limited. Specifically, few studies detail the risk of sFGD leachate given land application (Cheng, Walker, and Bigham 2007; Al-Abed et al. 2008). Exploration of beneficial reuse strategies is needed to increase the beneficial reuse of CCRs and reduce the amount of landfilled coal ash. These strategies should be assessed for human and ecological health risks to ensure safe, beneficial reuse. Accurate risk quantification involves a multifaceted approach, including laboratory leachate's statistical characterization and groundwater observations' geochemical modeling.

This section aims to quantify the human and ecological health risks of reclaiming an AML with CCR. We analyzed column results conducted following the leaching environmental assessment framework (LEAF) and batch results conducted with the SPLP with parametric bootstrapping for mean to quantify the risk associated with As, Se, and B to human and ecological health. Using these, we produced a geochemical reactive fate and transport model to predict the chemical composition of the shallow groundwater downgradient of the reclamation site. The geochemical model was calibrated with Bayesian Inversion (BI) methods, identifying likely parameters that produced an accurate model. The model was subsequently used to predict the human and ecological health impact of As, Se, and B from CCR 5 years later.

3.2.3 Method Employed

3.2.3.1 Conesville Phase III East

Starting in 2015, the AMLs in Conesville, OH, were subjected to reclamation with CCRs in a multiphase approach. The AML at the site had 20-meter-high walls, AMD seeps, and adjacent mine spoil piles. To reclaim the area spanning 0.12 km^2, nearly 1 million tons of sFGD and 1.2 million tons of other CCRs were beneficially reused.

In the area of interest for this research, Phase III East, sFGD, and other CCRs (FA, FGDG, and limestone FGD) were used as backfill material. Over 33% of the CCRs were obtained from the power plant's legacy landfills (~528,000 tons of sFGD and ~62,000 tons of fly ash (FA)). To reclaim Phase III East, water that had accumulated in the surface mine pit was removed. Then a 1.5 m thick layer of sFGD was placed along the highwall, base, and adjacent mine spoil bank. The other CCRs filled the lined cavity (**Figures 3-4 a, b**). A 1.5 m thick layer cap of sFGD was placed on top, completing backfilling with CCR (**Figures 3-4 c and 3-5**). The mine spoil adjacent to the AML was placed on top as a soil cap and vegetated with grasses and trees (**Figures 3-4 c and 3-5**). Vegetation of the AML completes the reclamation efforts, and water quality monitoring takes place for five years after completion. Completion of Phase III East occurred in November 2023.

Figure 3-4 (a) Dewatered pit with exposed highwall (left) and mine spoil bank (right). (Photo by Cheng, April 2015). (b) Placement of sFGD (light gray in the left portion of the image) along the high wall and FA (dark gray in the right portion of the image) into the pit). (Photo by Martin, October 2022). (c) An example of completed reclamation is the application of mine spoil cap and revegetation with grasses (hay laid to prevent erosion) (Photo taken in October 2022).

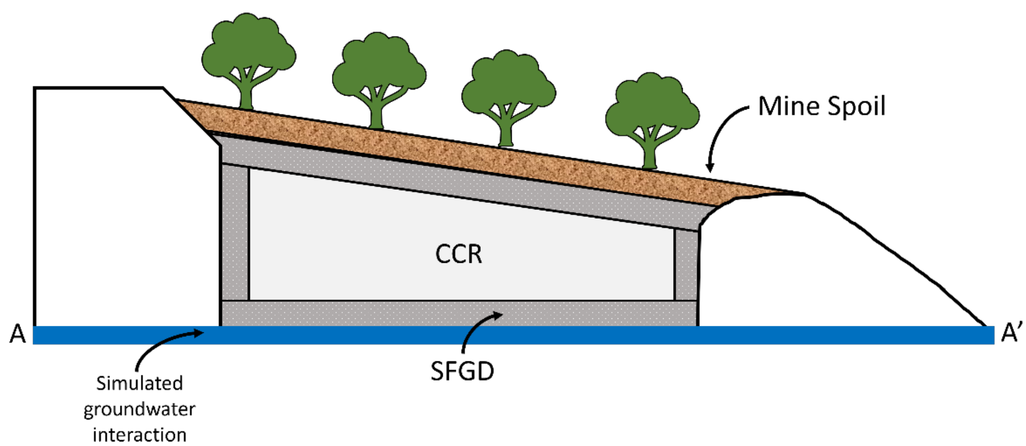

Figure 3-5. Cross section (A-A') depiction of Phase III East Reclamation (NTS). sFGD is placed within the AML pit to create a low-permeable seal with the other CCRs. Groundwater flows from A towards A'.

The Phase III East reclamation area was monitored for ground and surface water quality impacts (**Figure 3-6**). Monitoring wells MW-1405, MW-1705, and MW-1702 were placed in the shallow aquifer and sampled before, during, and after reclamation (**Figure 3-6)**.

The most upgradient well, MW-1405, was situated within the underground mine cavity in the LK No. 5 coal seam at 241.9 m relative to sea level. The seepage velocity (V) in the shallow groundwater was calculated with Darcy's Law to be 0.14 m/day (0.48 ft/day) based on results from a hydrogeologic survey (Haley & Aldrich, Inc 2015). The survey reported horizontal conductivity to be 0.6 m/day (1.9 ft/day), the hydraulic gradient to be 0.05, and the porosity to be 0.2 (Haley & Aldrich, Inc 2015). Shallow groundwater flow generally follows topographic contours, flowing radially away from MW-1405 (**Figure 3-6**).

The southeastern groundwater path was recorded by monitoring wells MW-1705 and MW-1702. MW-1705 operated within the sFGD fill for four years during reclamation to detect the presence of leachate in the shallow aquifer. MW-1702 is positioned on the outside edge of the reclamation site, and it is situated to detect any leachate extending away from the ash unit. The water table expresses at the surface directly downgradient of MW-1702 and is monitored at Seep-2. From there, the surface water travels down a ~6% slope, connects with the perennial stream flowing southwest along County Road 429, and is sampled at SW-04 (**Figure 3-6)**.

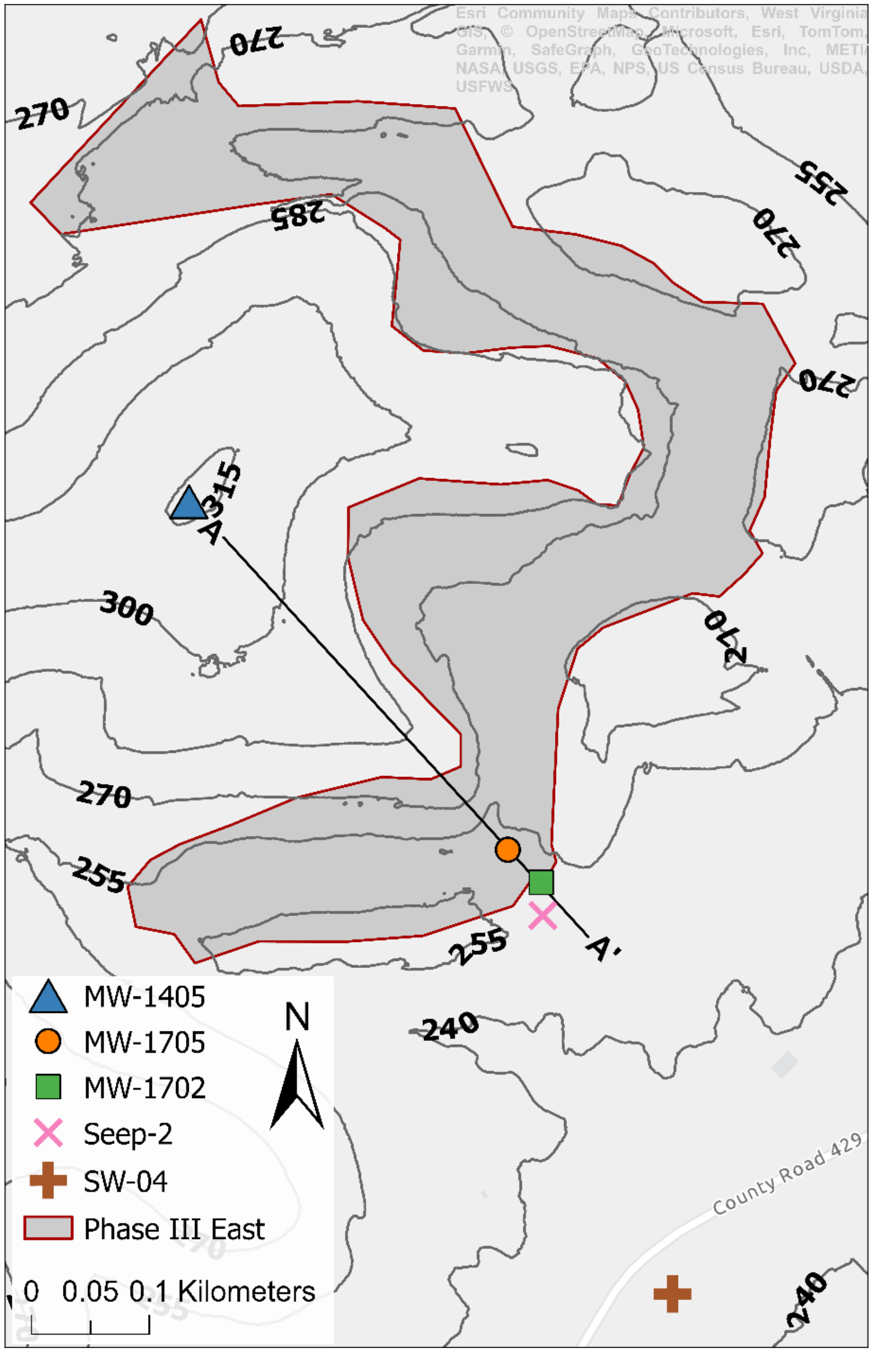

Figure 3-6. Conesville Phase III East Monitoring Locations. Contour lines show topographic elevations (m) above sea level with 15 m intervals. Phase III East is outlined in red. Shallow groundwater monitoring at MW-1405, MW-1705, and MW-1702 is shown, as well as seep and surface water sample locations Seep-2 and SW-04. The cross-section A-A' has a length of 500 m, 65 m which intersects with Phase III East. County Road 429 is in the southeastern part of the map.

3.2.3.2 Leaching Experiments and Detection Limits

sFGD samples (n = 67) from Phase III East were subjected to leaching experiments following US EPA Method 1314 (US EPA 2019). Nine experiments were conducted at The Ohio State University. The experiments aimed to evaluate the time-dependent nature of the CCR leachate using an eluent of DI water with a pH between 3-4. The acidic pH was achieved by adding H_2SO_4/HNO_3 to the DI water. An acrylic column filled with approximately 300 g of dried and ground sFGD. To ensure uniform flow, acid-washed inert silica sand was placed at either end of the column. After the column was packed, the eluent was directed up the column using a peristaltic pump. The pump was stopped once the column was fully saturated and left for 24 hours to equilibrate. After equilibration, the flow was restarted, and the eluent was directed up through the column at a constant flow rate of 1 liquid-to-solid ratio (L/S) per day. Leachate samples were collected daily until 10 L/S ratios were reached. Redox potential, conductivity, and pH were measured at the time of collection using a Mettler Toledo FiveEasy™FE20 meter, ORION model 130 conductivity meter, and Sartorius PB-11 pH meter, respectively. The elemental composition of samples was analyzed with AA, ICP, and IC using an Agilent 5100 ICP-OES and DIONEX ICS-2100, respectively.

Additional leaching experiments following the synthetic precipitation leaching procedure (SPLP) were conducted following US EPA Method 1312 every quarter on sFGD, FA, and FGDG samples from the Conesville Phase III East. Samples were sent to Eurofins Environmental Lab. SPLP experiments were conducted to compare the coal ash leachate composition with US EPA Primary MCL, Secondary MCL(US EPA 2015), and maximum acceptable leachate concentration (Ohio EPA 1994).

Additional measurements were conducted on sFGD samples, including X-ray diffraction (XRD) analysis and acid digestion. XRD was conducted to determine the mineralogy of sFGD. Relative abundances of minerals were evaluated with auto Rietveld estimates. Acid digestion determined the initial mass of 20 elements present in sFGD.

The leaching experiments include values recorded below the method detection limit (MDL) of the respective element, method, and instrument (see **Table 3-3**). For example, As and Se leachate concentrations included 37% and 42% measurements below the MDL, respectively, while all B measurements were above the MDL. Quantification of risk is dependent on the accurate measurement of element trace concentrations. Ignoring or mishandling records below the MDL may result in a biased quantification of risk (George et al. 2021). To reduce bias, we represented these results as interval-censored data. Interval-censored data replaces values with a range from zero to the MDL, spanning the domain where the true measurement existed. Censored data analysis is used in survival statistics (Davidson-Pilon 2019), and has been explored for chemical risk analysis (Millard and Deverel 1988). The data for each element i is represented as follows:

$$X_i = \{x_{i,1}, x_{i,2}, [0, MDL_{i,1}], [0, MDL_{i,2}] \dots x_{i,n}, [0, MDL_{i,l}]\}. \quad (1)$$

In equation 1, $x_{i,n}$ represents detected data, and $[0, MDL_{i,l}]$ signifies interval censoring due to the respective MDL. The total length of X_i is denoted as $N = n + l$. In our research, X_i could represent the As measurements from the column experiment above and below the MDL. $x_{i,n}$

would represent 63% of the measured As concentrations above the MDL. The domain would represent each measurement below the MDL $[0, MDL_{i,l}]$. Previous research has suggested using lognormal distribution for chemical data (Millard and Deverel 1988). We assumed that incorporating the data below the MDL would also resemble a lognormal distribution and thus represent X_i by a lognormal distribution. The lognormal distribution parameters were calculated with maximum likelihood estimation. To fit a lognormal distribution to the interval-censored data, we utilized the Censored Data class in the Python package Scipy ("Scipy.Stats.CensoredData — SciPy v1.13.0.Dev Manual," n.d.).

Table 3-3. sFGD percentage of values observed MDL

Element	% Non-Detect
As	37
Al	45
Ba	33
B	0
Cl	3
Cr	97
Cu	96
F	17
Fe	98
Pb	71
Mg	11
Mn	80
Ni	77
Ag	98
Se	42
Na	0
SO4	3
Zn	78

3.2.3.3 Parametric Bootstrap

After handling the leaching observations below the MDL, we utilized parametric bootstrapping to calculate the expected leachate concentrations and uncertainty. Parametric bootstrapping is a resampling method to find the distribution of a statistic. We calculated the mean elemental concentration for 20 recorded elements with varying percentages of values below the MDL (**Table 3-3**). The leaching data were represented with a lognormal distribution fit to the censored data. For each iteration m, we randomly sample from the lognormal distribution to generate an array $\hat{X}_{i,m}$ of elemental concentrations with length N. This array has mean, $\hat{\mu}_{i,m}$ and standard deviation, $\hat{\sigma}_{i,m}$. Repeating this process $M = 1{,}000$ times yields the sampled matrix $\hat{X}_i = \{\hat{X}_{i,1}, \hat{X}_{i,2}, \dots, \hat{X}_{i,M}\}$ along with calculated statistics: $\hat{\mu}_i = \{\hat{\mu}_{i,1}, \hat{\mu}_{i,2}, \dots, \hat{\mu}_{i,M}\}$ and $\hat{\sigma}_i = \{\hat{\sigma}_{i,1}, \hat{\sigma}_{i,2}, \dots, \hat{\sigma}_{i,M}\}$. We selected $M = 1{,}000$ because of the convergence of the mean and quantiles at this point. Any increase of M did not significantly change the results of the parametric bootstrap analysis.

3.2.3.4 Quantification of Health Risk

To identify the species of concern that leach from the CCRs used in the Conesville reclamation, we evaluated the risk for human receptors ingesting groundwater and ecological receptors in downgradient streams. For human receptors, we calculated the HQ, C_{risk}, and compared concentrations to the US EPA MCL (US EPA 2015). For aquatic receptors, we calculated the HQ_{aq} (R. 05 US EPA 2015). Of the 20 elements measured in leaching experiments, we filtered the data based on the percentage below the MDL and the existence of the required health thresholds. A high number of values below the MDL resulted in a poorly fit lognormal distribution to the interval-censored data. This occurred for data with > 75% values below the MDL and included six elements, Cr, Cu, Fe, Mn, silver (Ag), and Zn. These elements were not included in the risk analysis, and with such low concentrations, these elements are unlikely to pose a risk to human or aquatic receptors. Parametric bootstrap analysis was possible for observations that included 25% or more records above the MDL, which included ten species, Al, Ba, B, Cl, F, lead (Pb), Mg, Ni, Na, and sulfate. Of this subset, this work identified As, Se, and B for further analysis of risk to human and ecological receptors.

The non-cancer health risk due to ingestion of contaminated water, (HQ) is dependent on the concentration, C (mg/L), of the target contaminant in water (Equation 2). Where a cap H cap Q > 1 represents elevated non-cancer risk from ingestion of water. The RfD (mg/kg-day) values for elements were obtained from the US EPA Integrated Risk Information System (IRIS) Assessments(US EPA 2024). The intake rate, IR (L/day), and body weight, BW (kg), were calculated with the weighted average of a child, ages 0-11 years, at an exposure frequency, EF of 350 days/yr (US EPA 2011) (**Table 3-4)**. The absorption factor, ABS was set to 100% for gastrointestinal absorption (Asante-Duah 2002). Conservative quantification of risk to human receptors was calculated for a child (age 0-11 years) ingesting CCR leachate (**Tables 3-4 and 3-5**).

$$HQ = \frac{C*EF*IR*ABS}{BW*RfD*365\ days} \tag{2}$$

For the cancer risk, C_{risk}, due to water ingestion, only As was evaluated (Equation 3). The risk due to As was evaluated for exceedance of 1 in 100,000 (US EPA 2023). We conservatively evaluated cancer risk for a child exposed for a duration, ED, of 11 years out of the 70-year averaging time, AT (Asante-Duah 2002; US EPA 2023). The cancer slope factor, CSF, for As is 1.5 (mg/kg-day)$^{-1}$ (US EPA 2024).

$$C_{risk} = \frac{C*CSF*EF*ED*IR*ABS}{AT*BW*365\ days*1x10^{-5}} \tag{3}$$

The aquatic life hazard quotient (HQ_{aq}) was simply evaluated for exceedance of the aquatic criterion, AC (mg/L), as shown in Equation 4.

$$HQ_{aq} = \frac{C}{AC} \tag{4}$$

AC values were obtained from the ecological benchmarks for freshwater communities as described by the US EPA risk evaluation of FGD gypsum (FGDG) (US EPA 2023). These values were compiled from the criteria continuous concentration CCC (US EPA 2015c) and the Great Lakes Initiative Clearinghouse (US EPA 2015b) (**Table 3-5**).

Table 3-4. Intake Rate (IR) and Body Weight (BW) used in hazard quotient (HQ) calculations for a child age 0-11 years. This table was obtained from (US EPA 2011)

Age	Number of Samples of IR	Mean IR (mL/kg-day)	Number of Samples of BW	Mean BW (kg)	Mean IR (mL/day)	Mean IR (L/day)
birth to <1 month	37	137	158	4.8	657.6	0.6576
1 to <3 month	108	119	284	5.9	702.1	0.7021
3 to <6 months	269	80	489	7.4	592	0.592
6 to <12 months	534	53	927	9.2	487.6	0.4876
1 to <2 years	880	27	1176	11.4	307.8	0.3078
2 to <3 years	879	26	1144	13.8	358.8	0.3588
3 to <6 years	3703	24	2318	18.6	446.4	0.4464
6 to <11 years	1439	17	3593	31.8	540.6	0.5406

Table 3-5. Values critical to calculate risk for elements As, Se, and B. The $\boldsymbol{AC}$ for As, Se, and B indicate chronic exposure (365 days and longer)(R. 05 US EPA 2015; ATSDR 2022). The last column shows the percentage (%) of data measured above the MDL from column and SPLP leaching experiments.

Element	MCL (mg/L)	RfD (mg/kg-day)	AC (mg/L)	% above MDL
As	0.01	$3x10^{-4}$	0.15	63
Se	0.05	$5x10^{-3}$	0.0046	58
B	-	$2x10^{-1}$	0.95	100

3.2.3.5 Geochemical Model

A geochemical reactive fate and transport model was developed to understand the future health risk of hazardous species As, Se, and B using the software TOUGHREACT V4.13 OMP (Xu 2008)The model was calibrated using column leaching experiments to constrain uncertain chemical parameters governing the leachate behavior of As, Se, and B, with the aim of capturing the scenario of the sFGD barrier leaching into shallow groundwaters. This model was initialized with the minerals from the XRD analysis of sFGD material (**Table 3-6**). Kinetic parameters were estimated by Zhang et al. (Zhang, Branam, and Olyphant 2017) for the minerals hannebachite, ettringite, and hematite. Equilibrium conditions were applied to gypsum and calcite. After calibration of uncertain parameters, a site model was developed and compared to groundwater quality observations.

Table 3-6. Mineralogy of sFGD supplied to column model and site model determined from XRD. The volume fraction denotes the results of the auto Rietveld estimates of mineral abundances. The remaining volume fraction may include amorphous mineral phases.

Mineral	Chemical Formula	Volume Fraction (%)
Hannebachite	$CaSO_3 \cdot H_2O$	53.5
Gypsum	$CaSO_4 \cdot 2H_2O$	22.6
Calcite	$CaCO_3$	7.9
Ettringite	$Ca_6Al_2(SO_4)_3(OH)_{12} \cdot 26H_2O$	7.5
Hematite	a-Fe_2O_3	2.65

3.2.3.6 Column System Model

Based on US EPA Method 1314 experiments, the column system model simulated acidic fluid interaction with sFGD. This 2-dimensional model included sixty 5 x 5 cm cells with a constant 1-dimensional flow equal to ~1 L/S per day. The model simulated the interaction of the acidic eluent (**Table 3-7**) with sFGD under fully saturated conditions. The simulated effluent results were compared to the column experiment observations.

Table 3-7. Composition of eluent used i column system model.

Species	Eluent Composition (mol/L, except pH)
pH	3.42
Na^{+}	$2.07x10^{-4}$
Cl^{-}	$1.24x10^{-4}$
Ca^{+2}	$3.0x10^{-5}$
SO_4^{-2}	$1.46x10^{-3}$
Al^{+3}	$5.0x10^{-6}$
CO_3^{-2}	$1.74x10^{-15}$

3.2.3.7 Groundwater Site Model

The groundwater site model simulated the interaction of groundwater with natural soils and the sFGD barrier (**Figure 3-5)**. Phase III East was constructed to remain above the phreatic zone. However, the assumption of saturated pore spaces facilitated a conservative risk assessment where the sFGD barrier leaches under fully saturated conditions. The site model grid extends for 500 m with 2 x 2 m grid cells and is split into three domains (**Figure 3-6**). The first domain extends for 350 m, and waters interact entirely with quartz sandstone. The second domain, which captures the reclaimed Phase III East location, is initialized with the mineralogy and chemical composition of sFGD and extends for 65 m. The chemical parameters governing the leaching of As, Se, and B in the second domain are determined from the calibration of the column model with the BI analysis. After 65 m of interacting with sFGD, the fluid continues flowing through quartz sandstone until termination at 500 m. The assumption of quart sandstone in domains one and three facilitates a conservative risk assessment of fluid flow through non-reactive media. Model domains align with cross-section A-A' which intersects with MW-1405, MW-1705, MW-1702, and Seep-2, allowing comparison of model results to site observations (**Figure 3-6**). The influent waters are initialized with the composition of upgradient well MW-1405 averaged from data collected before reclamation started, from June 2015 to November 2015 (**Table 3-8**).

Table 3-8. Simulated Groundwater Composition based on averaged values of MW-1405.

Species	Composition (mol/L, except pH)
pH	7.56
Na^{+}	$1.020x10^{-2}$
Cl^{-}	$1.649x10^{-3}$
Ca^{+2}	$1.128x10^{-3}$
SO_4^{-2}	$8.366x10^{-3}$
Al^{+3}	$3.341x10^{-7}$
Fe^{+3}	$3.882x10^{-5}$
CO_3^{-2}	$3.607x10^{-3}$
H_3AsO_4	$4.146x10^{-9}$
$HSeO_3^{-}$	$7.511x10^{-10}$
H_3BO_3	$7.000x10^{-6}$
H_4SiO_4	$6.874x10^{-5}$

TOUGHREACT V4.13 OMP is a parallelizable geochemical reactive transport modeling software. Fluid flow is governed by pressure, given saturated conditions. The release of trace elements from host minerals was simulated with equilibrium and kinetic conditions. Under kinetic conditions, TOUGHREACT simulates mineral reaction by calculating the rate r of precipitation ($r_n < 0$) or dissolution ($r_n > 0$) (Equation 5).

$$r = kA_r\left|1 - \left(\frac{Q}{K}\right)^{\theta}\right|^{\eta} \tag{5}$$

where k is the temperature-dependent rate constant, A_r is the specific reactive surface area, Q is the reaction quotient, and K is the equilibrium constant for the aqueous complexes involved with the mineral reacting with water. Equation 5 takes the form of the transition-state-theory equation with exponential parameters θ and η assumed to be equal to one (Lasaga 1981). The reactive surface area is determined with equation 6 and is dependent on the initial mineral volume fraction V_f, the initial mineral surface area A_m, and normalized by the wetted-surface conversion factor C_w.

$$A_r = \frac{V_f A_m}{C_w} \tag{6}$$

k, V_f, and A_m are directly input to the TOUGHREACT software. Approximation of V_f could be accomplished for the column experiments. We calculated the volume fraction for the As host mineral and Se host mineral (V_{fAs} and V_{fSe} , respectively) by multiplying the total leachable content (%) by the observed percentage leached in the column experiments.

The material analyzed included trace amounts of As, Se, and B. The mineral phases hosting As, Se, and B could not be measured with XRD analysis, but the elements were detected in the acid digestion of the solid samples. Effluent waters included increased concentrations of As, Se, and B. Based on the results of Wang et al., Jin et al., and Cheng et al., we proposed calcium-bearing host minerals to be the source of As and Se (X. Wang et al. 2022; Jin et al. 2023; Cheng, Walker, and Bigham 2007). To simulate the release of As and Se from these minerals, we needed accurate estimates for the kinetic dissolution mineral parameters $k,$ and A_m. We refer to these parameters as k_{As}, A_{As} and k_{Se}, A_{Se} to describe the kinetic rate parameter and initial surface area for the As and Se calcium host minerals, respectively. From minerals available in the MINTEQA2 database (Allison, Brown, and Novo-Gradac 1991), we selected the host mineral phases $Ca_3(AsO_4)_2 \cdot 4H_2O$ and $CaSeO_3 \cdot 2H_2O$ to simulate the release of H_3AsO_4 and $HSeO_3$- into solution. The highly mobile leaching of B is dependent on available B and is pH-independent (Cox et al. 1978). The column experiments indicated B from sFGD exhibits a first flush behavior. Therefore, B was simulated as an initial aqueous composition of H 3BO3 to capture the highly mobile nature observed instead of the mineral phase. The initial aqueous concentration of H_3BO_3 parameter ($C_{H_3BO_3}$) was uncertain and, along with k_{As}, A_{As} and k_{Se}, A_{Se} required calibration.

3.2.3.9 Bayesian Inversion

Calibration of uncertain chemical parameters from the column and site model was conducted with Bayesian Inversion (BI). The Matlab-hosted software for uncertainty quantification, UQLAB was used to conduct BI analysis of uncertain model parameters (Marelli and Sudret 2014). BI involves providing (1) a model with uncertain parameters, (2) prior distributions of the uncertain parameters, and (3) observational data (P.R. Wagner et al. 2022). To solve the posterior distribution of the uncertain parameters, the prior distribution is sampled with an affine invariant ensemble algorithm (AIES) (Goodman and Weare 2010). AIES is an algorithm that adaptively searches for the optimal solution to a minimization function by applying affine transformations to a subset of the prior distribution space (Goodman and Weare 2010). When an acceptable candidate is chosen, it is provided for the estimate of the posterior distribution. After iteratively solving for acceptable candidates, a burn-in of 50% is removed before estimating the parameter mean (P.R. Wagner et al. 2022).

3.2.3.10 Calibration of Column Model Parameters

The calibration process for five uncertain chemical parameters was conducted with BI. Specifically, the parameters k_{As}, A_{As} and k_{Se}, A_{Se}were calibrated for the mineral phase $Ca_3(AsO_4)_2 \cdot 4H_2O$ as well as for the mineral phase $CaSeO_3 \cdot 2H_2O$ to capture the concentrations of As and Se in column experiments. Calibration of $C_{H_3BO_3}$ was conducted for B in column effluent. Uniform prior distributions spanning the domain of possible values for the five identified uncertain parameters were provided to the UQLAB BI process. The posterior distributions of the input parameters were obtained by evaluating 300 steps per chain across a00 chains with the AIES solver. Each AIES-selected candidate of the input parameters represented a potential model solution. Candidates were assessed for acceptance or rejection based on the calculated discrepancy (P.R. Wagner et al. 2022) between column leachate observations and model results of H_3AsO_4, $HSeO_3$-, H_3BO_3 and pH.

3.3 Results

3.3.1 Risk Analysis of Leaching Experiments

The human health risk was quantified with the HQ, MCL, and C_{risk} for eight elements detected in sFGD leachate: As, Se, B, Ba, Ni, Al, F, and Pb. The risk analysis did not include six elements because excess observations below the MDL produced a poorly fit lognormal distribution to the interval-censored data. Of the eight elements analyzed for risk from the leaching experiments, only As, Se, and B were further evaluated for risk. As and Se were selected because of the exceedance of thresholds, and B was selected because of the potential mobilization into ground and surface waters.

Fractions of available As and Se were observed to leach from sFGD in the LEAF experiments (**Figure 3-7)**. There was on average 66.6 mg As/kg sFGD, 3.47 mg Se/kg sFGD, and 1644.9 mg B/kg sFGD. From the nine column leaching experiments, we determined the average percentage of As, Se, and B leached. As leached on average, 1.6% of the total available content and Se leached less, only 0.18 % (**Figure 3-7**). Similar to research on FA (Izquierdo and Querol 2012), B was highly soluble and readily leached into effluent waters, averaging 68% of the total available content. B mobilized with the overall flow of the experiments. Comparatively, As and Se leached considerably less of their respective available content. The limited leaching of As and Se supported the kinetic dissolution of host mineral phases.

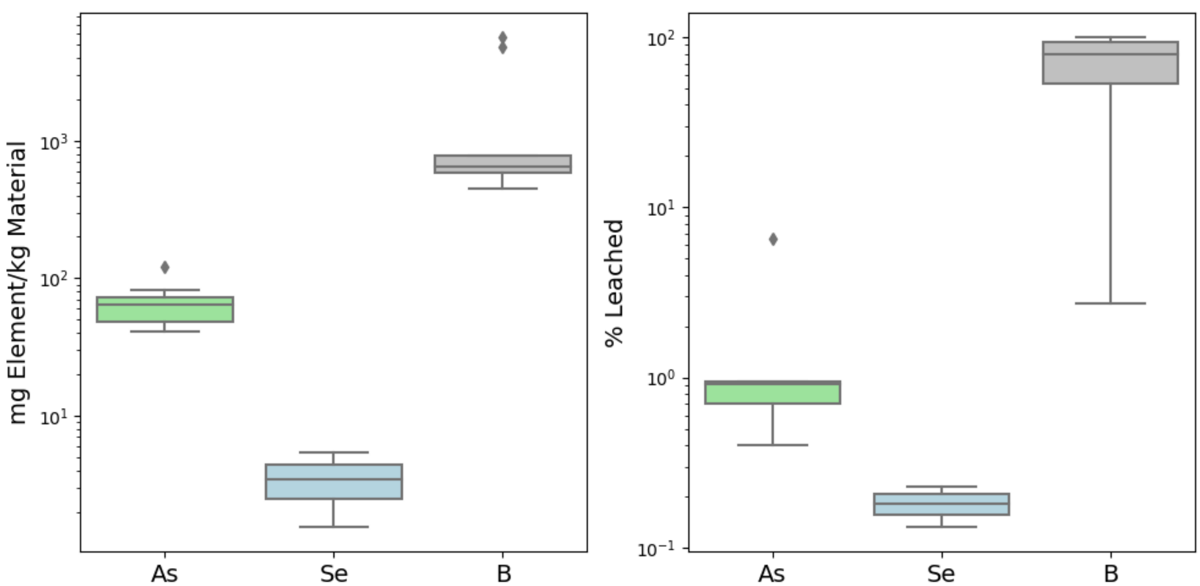

Figure 3-7. Elemental content of sFGD (left) and percentage leached (right) of As, Se, and B from column experiments.

The results of the column leaching experiments indicated the potential exists for sFGD to leach As and Se above acceptable human health and ecological thresholds, respectively (**Figure 3-8**). Arsenic from sFGD leachate posed an elevated cancer risk in the event of a child ingesting the leachate as a primary drinking water source. Selenium and B were likely to exist in sFGD leachate at ~2 and 4 times the chronic threshold for aquatic life, respectively. Selenium and B in sFGD leachate are not expected to pose a risk to human health ($HQ < 1$). Although less than the acute benchmark for aquatic life (8.5 mg/L) (US EPA 2015b), B was expected to leach at concentrations that pose toxicity to plant life (>1.5 mg/L) (Robert Reid 2007) and exceeded the chronic criteria for aquatic life as set by Ohio EPA (0.95 mg/L) (US EPA 2015b). Plant toxicity due to B released from mine reclamation has been observed at an AML reclaimed with CCRs and subsequent remediation required land application of lime at 25 tons/acre (Pasini 2009).

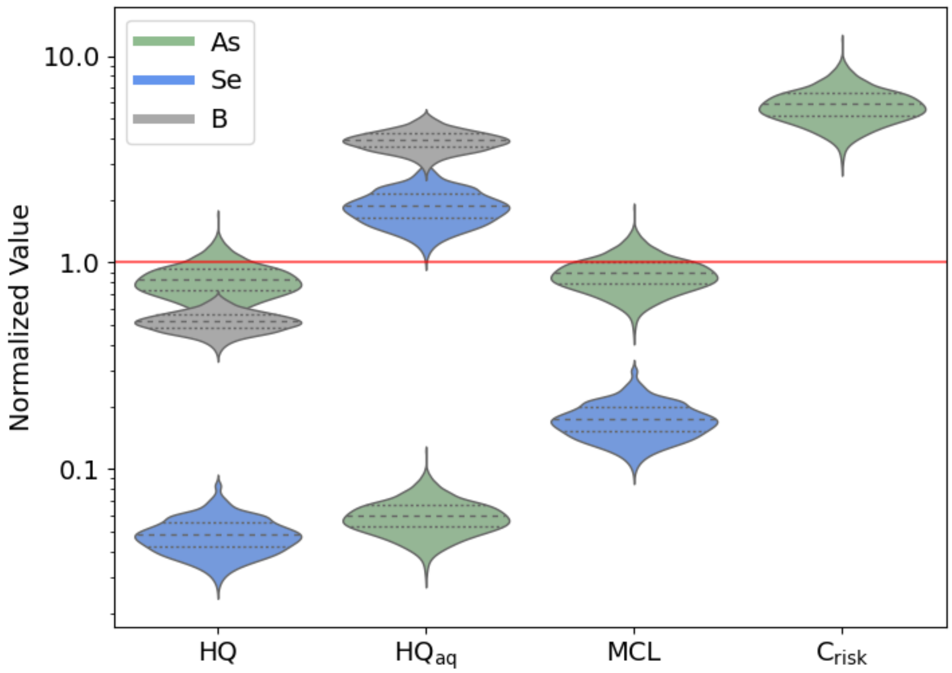

Figure 3-8. Human and Ecological Health Risk Calculated with Parametric Bootstrap Mean for sFGD. Violin plot of parametric bootstrap mean distribution of As, Se, and B from sFGD leachate. Violins denote the parametric bootstrap distribution of mean used in calculations of HQ, HQ_{aq}, exceedance of the MCL, and C_{risk}. Within the violins, the dashed line indicates the mean and dotted lines mark the upper and lower quantiles. The horizontal solid line at 1.0 represents the threshold above which risk is exceeded. HQ_{aq} shows the Parametric Bootstrap expected concentration normalized with the chronic AC values shown in Table 4. Exceedance of the drinking water standard is shown in the MCL column. The distributions are normalized for MCL values 0.01 mg/L and 0.05 mg/L for As and Se, respectively. The risk of cancer due to As is shown as increased likelihood of cancer in a population of 100,000 (US EPA 2023).

3.3.2 Geochemical Model Results

As and Se in sFGD leachate were simulated with the kinetic dissolution of calcium host phases, and B was simulated via the transport of aqueous boric acid. The calibration of uncertain parameters with BI led to a well-performing model that accurately represented the temporal trends of As, Se, and B concentrations in the column effluent. Calibration with BI for the column model achieved adequate convergence with 300 steps and 300 chains. Five parameters and their associated uncertainty were determined. The posterior distribution of these five parameters produced variations of the column model for quantifying model uncertainty (**Figure 3-9**). The kinetic rate parameter and surface areas for the predicted As and Se-containing mineral phases: $\mathrm{Ca_3(AsO_4)_2\ 4 \cdot H_2O}$ and $\mathrm{CaSeO_3 \cdot 2H_2O}$ were approximated with their associated uncertainty (**Table 3-9**). The parameters k_{Se} and A_{Se} were predicted to be larger than k_{As} and A_{As} (**Table 3-9**). This may reflect that Se dissolution in column leachate occurred faster and more uniformly than As dissolution (**Figure 3-9**). The model of As is conservative and provides an uncertain estimate of the column data. Meanwhile, the model of Se captures the first flush behavior, trending towards values below the MDL. The column model captured As observations but with a large uncertainty. Simulated Se captured the shape and magnitude of Se observations with a tighter bound of uncertainty.

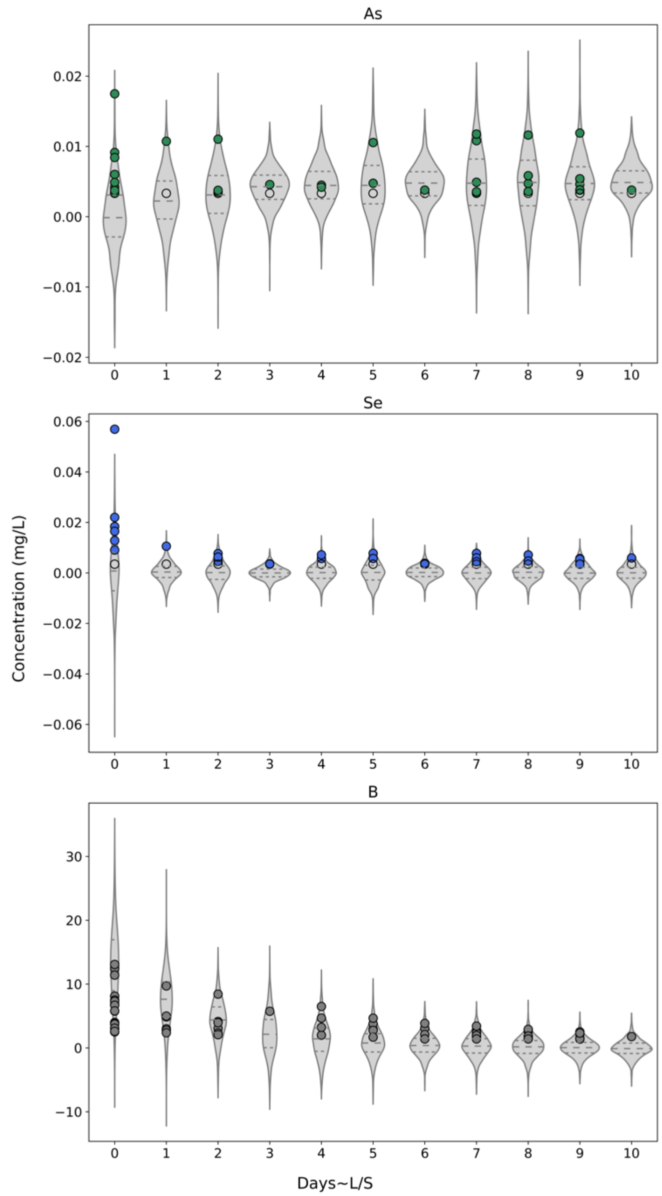

Figure 3-99. Column experimental data (filled dots) and observations below the MDL (open dots) for As, Se, and B each day, approximately equaling one L/S. These data are compared to the results of the BI shown by the violins. The BI results represent the model and data uncertainty. Each violin represents the posterior model error when provided with a prior Gaussian distribution. Negative distribution tails are an artifact of assuming the prior Gaussian distribution of the uncertainty.

The posterior distribution of uncertain parameters was either normally or lognormally distributed. The spread of the posterior distribution for k_{Se} and A_{Se} converged on a narrow band of values with a normal distribution around the posterior predicted mean (**Table 3-9)**. The k_{As} and A_{As} posterior distributions did not converge with a normal posterior distribution, but rather a lognormal posterior distribution. The convergence with a lognormal distribution made the posterior estimates span a larger domain, which may have caused the larger band of uncertainty.

Simulating boric acid (H_3BO_3) as the contributing species for B in the column system leachate accurately captured the early release of B but underestimated the late time release into the leachate. The goal for modeling B was to capture the high mobility and peak concentration of B. The model achieved this but failed to capture the additive loading of B on the environment with time. The posterior estimate of $C_{H_3BO_3}$ captured B observations in the first four days and simulated the B to be depleted by day 5. Whereas the results of the column experiments demonstrated late time (> 5 days) B concentrations of ~0.5-2.5 mg/L.

Table 3-9. Uncertain model parameters prior uniform distributions and posterior estimates (mean, μ and standard deviation, σ). $\boldsymbol{k_{As}}$ and $\boldsymbol{k_{Se}}$ are in units of mol /m^2/s, $\boldsymbol{A_{As}}$ and $\boldsymbol{A_{Se}}$ are in units of cm^2/g, and $\boldsymbol{C_{H_3BO_3}}$ is in mg/L.

Species	**Paramete r**	**Prior Distribution**	**Posterior Estimate**	**Distributio n**
$\boldsymbol{Ca_3(AsO_4)_2 \cdot 4H_2O}$	k_{As}	$U(1x10^{-8}, 1x10^{-4}$	$\mu = 7.99x10^{-6}$ $\sigma = 9.41x10^{-6}$	Lognormal
	A_{As}	$U(20{,}800)$	$\mu = 218.72$ $\sigma = 227.19$	Lognormal
$\boldsymbol{CaSeO_3 \cdot 2H_2O}$	k_{Se}	$U(1x10^{-8}, 1x10^{-4}$	$\mu = 5.49x10^{-5}$ $\sigma = 2.01x10^{-5}$	Normal
	A_{Se}	$U(70{,}3000)$	$\mu = 1565.35$ $\sigma = 629.53$	Normal
$\boldsymbol{H_3BO_3}$	$C_{H_3BO_3}$	$U(2{,}27)$	$\mu = 14.5$ $\sigma = 2.8$	Normal

Given the high degree of uncertainty associated with the leaching of As and Se from sFGD, calibration with BI enhanced the possibilities of accurate model predictions of transport at the site based on the column leaching observations. The column model suggested that the kinetic dissolution of the selected calcium host phases may adequately describe the leaching of As and Se from sFGD. Studies have suggested the possible association of As with iron oxides, and Se with other geochemical phases (Al-Abed et al. 2008). However, column results indicated limited release of Fe (**Figure 3-10**), which suggested that co-precipitation with Ca-minerals was the possible leaching mechanism. These model limitations were also selected because of limited alternate calcium mineral host phases in geochemical databases and computational cost of calibrating more than two host minerals.

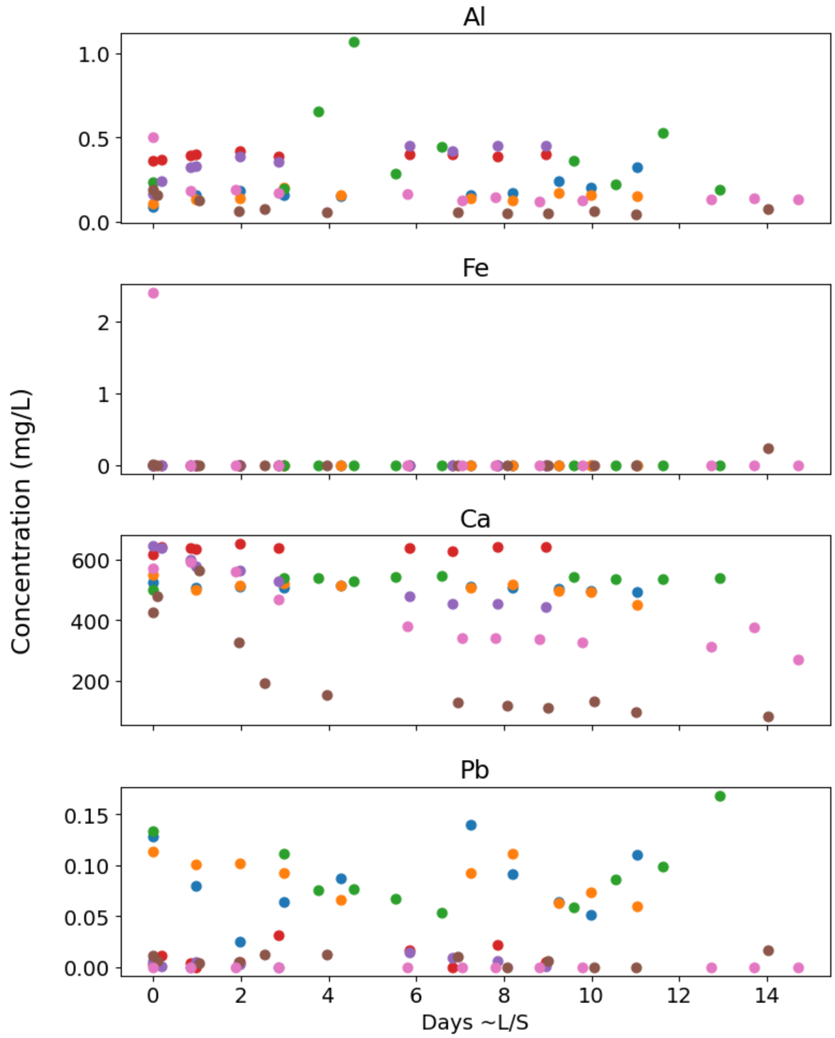

Figure 3-10. Selected elemental concentrations from column experiments: Al, Fe, Ca, and Pb.

3.3.3 Phase 3 East Water Quality Risk Analysis and Application of Geochemical Model

Downgradient of Phase III East, concentrations of As and Se were largely below human health and aquatic life thresholds (**Figure 3-11**). Waters beneath the ash unit at MW-1705 temporarily recorded As values above the MCL. However, it is unlikely that MW-1705 will serve as a drinking water source. Se concentrations at the downgradient stream approach the chronic aquatic life threshold set by Ohio EPA (4.6 $\mu g/L$) but did not surpass this threshold. As and Se recorded at MW-1405 decreased below the detection limit shortly after the reclamation of Phase 3 East began. If performing as expected, the sFGD barrier may have reduced oxygen within the underground mine. Reduced oxygen may limit the formation of AMD and the subsequent mobilization of As and Se from site minerals (Rudisell et al. 2001)As was detected in waters downgradient of Phase III East at MW-1705 and MW-1702 after values decreased below the MDL at MW-1405. This indicates a source of As downgradient of MW-1405. Max concentrations were observed at MW-1705, which is well placed to detect CCR leachate in shallow groundwater.

Se and As observations suggested different transport mechanisms (**Figure 3-11**). Se exhibited high mobility compared to As in MW-1705 and immediate downgradient well MW-1702. Se concentrations at MW-1705 were similar in pattern and magnitude to Se concentrations at MW-1702. Se generally mobilized with the groundwater flow from the source at or before MW-1705. Conversely, as transport exhibited retardation effect, As concentrations at MW-1705 and MW-1702 were reduced in magnitude and had a decreasing trend with time.

A plume of B was detected soon after the Conesville Phase III East reclamation began. B continued to spike throughout reclamation and appeared to travel in the shallow groundwater from MW-1705 to MW-1702. The B plume was expressed to the surface at SEEP-2 and later impacted SW-04 (**Figure 3-11**). The unwavering concentration of B at upgradient well MW-1405 (mean = 0.43 mg/L, std = 0.05 mg/L) was significantly lower than values of B at wells MW-1705, MW-1702, and seep and surface waters Seep-2 and SW-04 ($p < 0.05$). The B has exceeded the acute and chronic AC of 8.5 mg/L and 0.95 mg/L (R. 05 US EPA 2015) at both seep and surface water locations Seep-2 and SW-04. The source of B may be from sFGD, as modeled (**Figure 3-11**) and predicted by the Parametric Bootstrap results, or from other source minerals not modeled, such as coal refuse or exposed minerals within the underground mine.

The geochemical reactive fate and transport model was used to predict As, Se, and B concentrations at MW-1702, the shallow groundwater well immediately downgradient of Phase III East. Posterior estimates for parameters for $k_{Se}, k_{As}, A_{Se}, A_{As}$, and $C_{H_3BO_3}$ were applied to the site model. The column experiments represented a severe scenario of sFGD leaching. As calculated from the column experiments, V_{fAs} and V_{fSe} represented fluid fully interacting with sFGD with values of $6.07x10^{-7}$ and $1x10^{-8}$ for V_{fAs} and V_{fSe} , respectively. The site model was sensitive to V_{fAs} and V_{fSe} and since these values were unknown, they were estimated by assuming the values calculated from the column experiments represented maximum values. We simulated a range of lower possible values of V_{fAs} and V_{fSe} for the site model and show this as the band of model uncertainty in **Figure 3-11**. The range of values of V_{fAs} and V_{fSe} applied to the site model represented the initial abundance of $Ca_3(AsO_4)_2\ 4 \cdot H_2O$ and $CaSeO_3 \cdot 2H_2O$ to be equal to or less than V_{fAs} and V_{fSe} determined from the column experiments. Adjustment of Vf_{Se} produced a well-fitting model of Se. Adjustment of V_{fAs} does not account for the observed retardation effects (**Figure 3-11)**. The model of As simulated only dissolution of $Ca_3(AsO_4)_2 \, 4 \cdot H_2O$ and transport of As without retardation or secondary precipitation. Further research should explore the effects of As transport in the environment after leaching from sFGD such as precipitation into other minerals such as scorodite ($FeAsO4 \cdot 2H_2O$) or adsorption to iron or aluminum oxides.

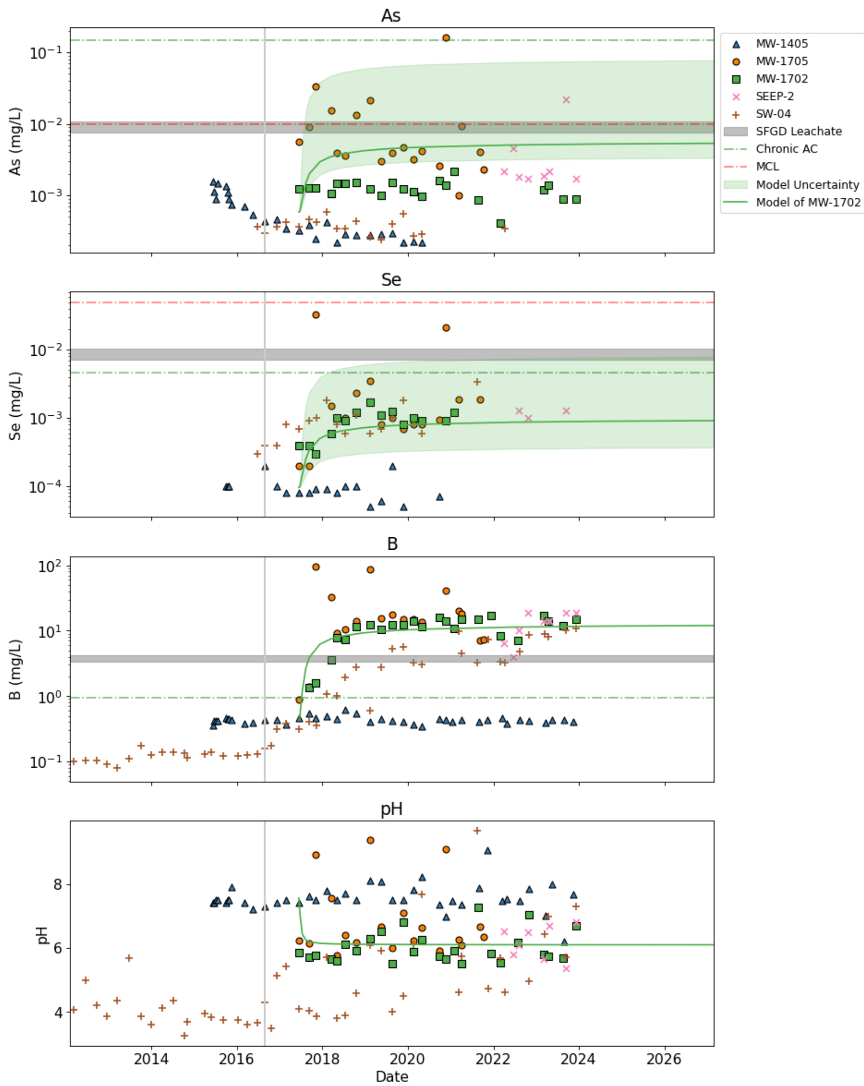

Figure 3-11. Phase 3 East water quality observations from shallow groundwater wells: MW-1405, MW-1705, and MW-1702; seep: SEEP-2; and surface water: SW-04. The gray horizontal band indicates the parametric bootstrap mean concentration +/- one standard deviation of As, Se, and B from the column and SPLP experimental results. The site model of MW-1702 is shown by the solid green line, with the five calibrated parameters equal to the posterior estimates and $\boldsymbol{V_{fSe} = 1x10^{-9}}$ and $\boldsymbol{V_{fAs} = 6.07x10^{-9}}$. The green band shows the sensitivity of the model to the volume fraction parameter when $\boldsymbol{V_f \sim U(1x10^{-11}, 1x10^{-7})}$. The gray vertical line denoted the start of Phase 3 East reclamation in August 2016.

Human health risk thresholds are not projected to be exceeded at the site because of reclamation. However, the model predictions indicated the ecological risk to aquatic life due to elevated B. Model predictions with Vf_{As}Similar to column experiments, As was suggested to leach above the MCL and Se to leach above the AC. However, on-site measurements revealed that As levels are well below the MCL, and Se remained below the AC. Therefore, the worst-case scenario observed in the column experiments did not materialize at the site. Conversely, the model predicted B concentrations well, given the calibrated initial concentration of boric acid. B was projected to continue to be present at concentrations above the AC, which may pose a risk to the perennial stream's aquatic life. Extended periods of B exposure may cause developmental issues in aquatic life (Soucek, Dickinson, and Koch 2011) and plant phototoxicity (Robert Reid 2007).

The geochemical model assumed As, Se, and B concentrations were sourced entirely from sFGD. The source of these trace elements may have been from (1) the sFGD barrier (2) other CCRs leached during active reclamation, (3) a combination of both 1 and 2, or (4) mobilization from new groundwater paths interacting with onsite natural minerals because of topographic alterations. If sFGD was leaching into the shallow groundwater, we would expect the B plume to start decreasing, as observed in the leaching experiments (**Figure 3-12**). Analysis of the other CCRs from the site: FA and FGDG indicated that B leached at ~ 10 mg/L (**Figure 3-13**). Further research should characterize the extent to which if any, interior CCRs have leached. If so, the finite source of B would increase from B sourced from sFGD alone to B sourced from sFGD, FGDG, and FA. FGDG and FA were also observed to leach As and Se in the SPLP experiments, so this scenario may also contribute to concentrations of As and Se (**Figure 3-13)**. One approach to distinguish if the trace elements were from CCRs is isotopic analysis, which can be used to determine if the waters with elevated B have isotopic fingerprints of coal ash. This is determined through analysis of $\delta^{11}B$ and $^{87}Sr/86Sr$ (Harkness, Sulkin, and Vengosh 2016).

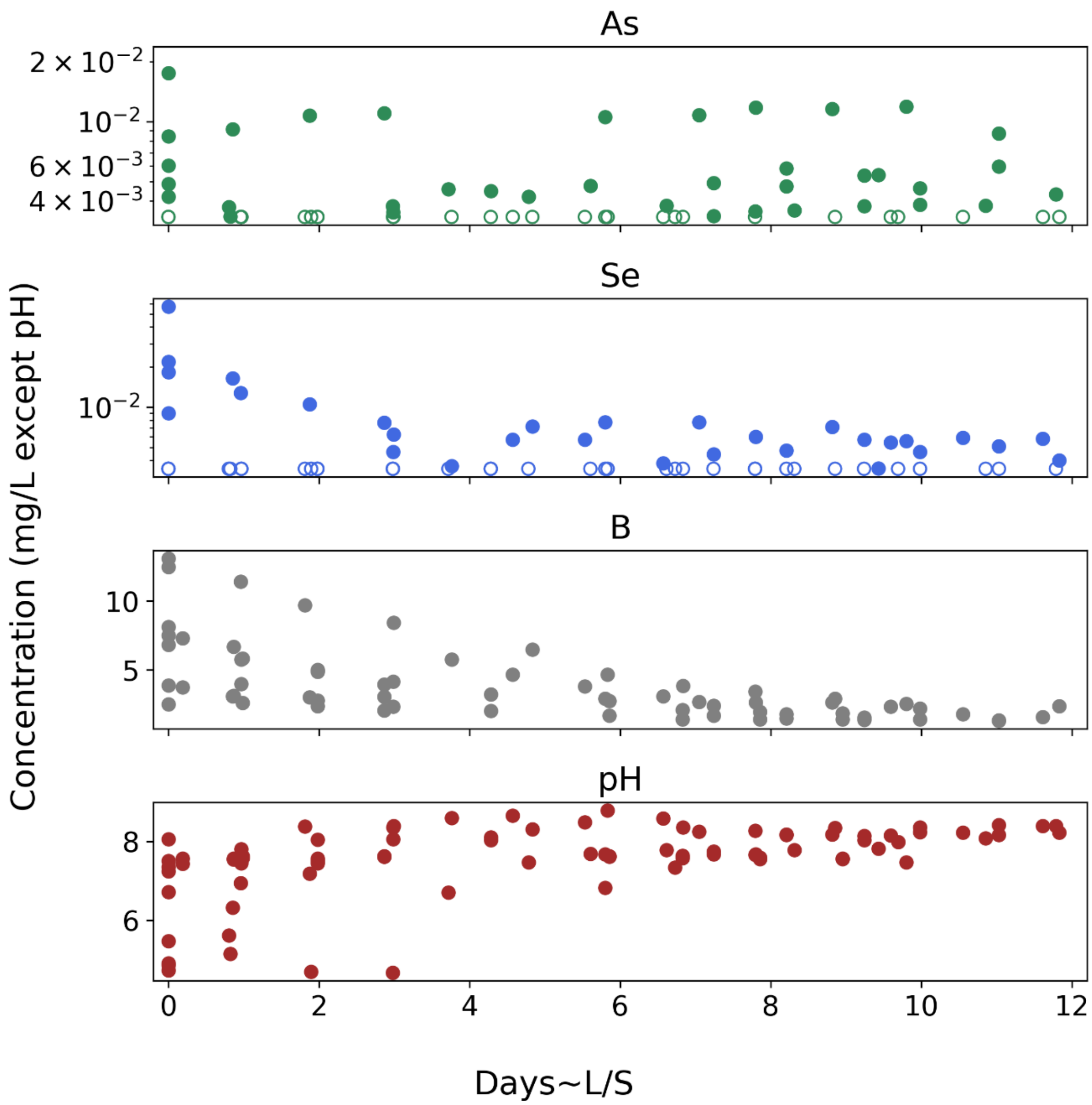

Figure 3-12. Results of column leaching experiments over days that approximately equaled 1 liquid to solid ratio (L/S). Filled dots indicate measurements above the MDL and open dots indicated measurements below the MDL.

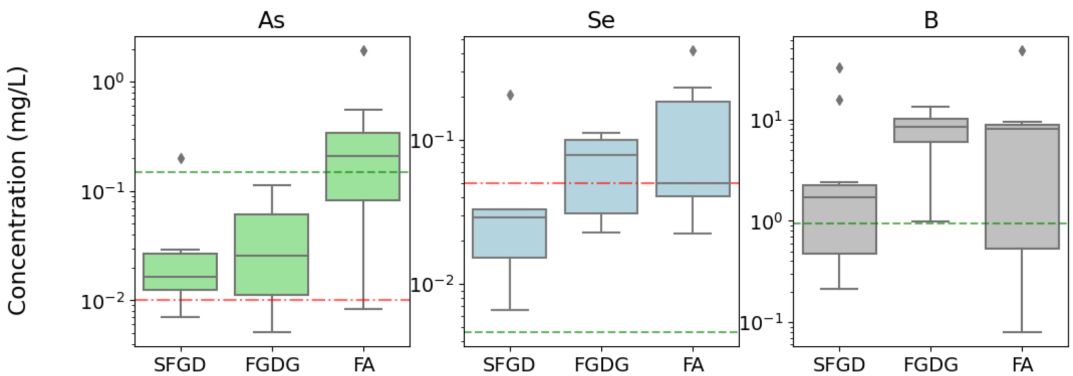

Figure 3-13. SPLP results of three CCRS placed in Phase III East with associated MCL (red dot-dashed line) and chronic AC (green dashed line). These box plots indicate the mean, standard deviation, and outliers of the data above the MDL for the SPLP data results only. sFGD had 12 As, 6 Se, and 14 B measurements, FGDG had 6 As, 13 Se measurements, and 12 B measurements, and FA had 6 As, 13 Se, and 12 B measurements.

3.4 Summary of Work

This work (1) determined the likely leachate concentration with an interval-censored parametric bootstrapping approach, (2) developed a geochemical model with TOUGHREACT software, and (3) calibrated uncertain parameters of the geochemical model with BI.

All of these facilitated the risk assessment of reclaiming the AML in Conesville, OH with CCRs. Specifically, we explored the application and risk of using sFGD as a low-permeability barrier.

Risk is quantified given water quality observations in experiments and at locations around Phase III East. We identified SFGD as potentially leaching As above human health thresholds.

Although As released from sFGD has the potential to pose risk to human health, we do not identify any risk to human receptors because of the Phase III East reclamation at Conesville. This was reflected by groundwater effects that occurred entirely in the shallow aquifer. The shallow aquifer does not serve as a drinking water source however, it does discharge to surface waters.

The surface waters were impacted by reclamation in two ways. The first included benefits of AMD remediation due to the neutralization of pH as evidenced by the surface water pH increasing from acidic (pH <5.0) towards a neutral pH (**Figure 3-12**). The subsequent negative impacts of reclamation included elevated concentrations of contaminants that may be sourced from the sFGD barrier. Our analysis of As, Se, and B indicated that sFGD could potentially increase the level of B detected in downgradient waters. Further analysis should evaluate the source of elevated concentrations of other elements that do not have aquatic life thresholds set by Ohio EPA. SW-04 detected elevated concentrations of Cl, sulfate, K, Ca, Mg, Mn, Na, and lithium (Li) (Section 4.6). Additionally, concentrations of Sr were elevated in SW-04, but elemental analysis of Sr was not conducted in column experiments so conclusions about Sr source could not be made. Sr does not exceed the aquatic threshold set by Ohio EPA at SW-04.

3.4.1 Conclusion of Risk due to As, Se, and B

In this research, we quantified the human and ecological health risk of As, Se, and B from sFGD leachate with parametric bootstrapping and geochemical models. We captured the probability of As, Se, and B to leach from sFGD by including interval-censored data. These results indicated As, Se, and B to exceed risk thresholds in a column-leaching setting. Phase III East reclamation has successfully decreased concentrations of As and Se within the underground mine. However, concentrations of As and Se increased in downgradient shallow groundwater wells shortly after reclamation began. A plume of B has reached the perennial stream (SW-04) downgradient of Phase III East, and since the concentration has exceeded the acute AC since November 2022 and the chronic AC since February 2018, it presents the potential to negatively impact aquatic life.

Calibration of the geochemical model with BI methods allowed for the highly uncertain model parameters to be selected with a data-driven selection process. This method produced an accurate model of sFGD interactions with groundwater that was applied to a simplified model depiction of Phase III East to predict future concentrations of As, Se, and B. From model results, As and Se did not pose a human or ecological risk, but B may pose a risk to aquatic systems. Ingestion of the waters at Phase III East is unlikely, but the methods and models presented here may offer insight for future reclamation efforts.

The AML that once caused hazards in Conesville, OH has been reclaimed with limited present or future risk. This work suggested that with proper handling of the highly mobile B leachate, the reclamation of AMLs with an sFGD barrier may be a functional and environmentally low-risk reclamation strategy.

Despite CCR generation decreasing in recent years, landfilled CCRs continue to pose a risk to the environment. Environmental risks due to As and Se from CCRs are challenging to predict, given the complexity of leaching and transport mechanisms. This work offered an option, interval censored parametric bootstrapping and model calibration with BI, to quantify risk due to As, Se, and B from sFGD. Interval-censored parametric bootstrapping is a simple way to understand the probability of expected leachate. This method may be applied to any beneficial reuse application conducting LEAF, SPLP, or related leaching experiments. We assumed As and Se to leach entirely from Ca-mineral phases in sFGD for our simulations. Future work may apply this method to calibrate the uncertain parameters of As and Se leaching from iron-oxides in other CCRs requiring risk quantification.

3.4.2 Risk due to Constituents of Potential Concern

The human health risk was quantified with the hazard quotient for 14 elements detected in sFGD leachate. These 14 elements included: Ni, Cr, Cd, Ag, Se, Fe, Mn, Cu, Zn, As, B, Be, Al, and Ba.

these, As, Se, and Pb exhibited concentrations likely to pose a risk to aquatic receptors (**Figure 3-14**). Risk due to ingestion of sFGD leachate by a child was evaluated for As, Se, and B, as described in earlier sections of this chapter.

Pb was determined to leach concentrations likely to exceed the US EPA treatment technique (TT) limit of 0.015 mg/L. The parametric bootstrap analysis produced an expected concentration of Pb in sFGD leachate to be 0.0238 +/- 0.0035 mg/L. The parametric bootstrap analysis was conducted with 25 detected observations and 62 observations below the MDL from both column and SPLP leaching experiments. We decided to exclude Pb from the geochemical modeling analysis as described earlier in this chapter because of the low mobility of Pb in natural waters and because we did not detect increased Pb in surface water near Phase III East (**Figure 3-15**).

Although Pb is likely to leach from sFGD, it is unlikely to be mobilized into ground and surface waters because of Pb's affinity to adsorb to soils (Fonseca et al. 2011). Pb mobilization from sFGD has limited documentation when compared to Pb mobilization from FA and FGDG (X. Wang et al. 2022; US EPA 2023; J. Wang et al. 2016). Given Pb speciation in sFGD is similar to FA or FGDG, mobilization may be reduced through adsorption on the surface of iron oxides and clay minerals (J. Wang et al. 2016). Although the release of Pb is likely to exceed the TT in sFGD leachate, adsorption makes it unlikely for Pb to mobilize into ground or surface waters. Pb has not been detected in Phase III East shallow groundwaters or surface waters above the TT (**Figure 3-15**). With limited observed mobilization potential, we do not expect Pb to pose a risk to human or aquatic receptors.

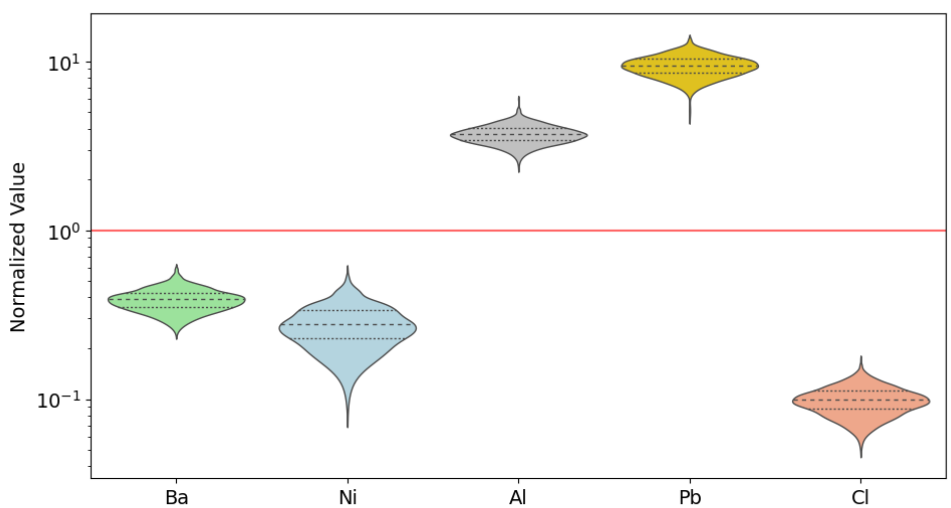

Figure 3-14. $\boldsymbol{HQ_{aq}}$ determined with parametric bootstrap mean of sFGD leachate. AC values are normalized with respect to each element where the AC for Ba = 0.22 mg/L, Ni = 0.052 mg/L, Al = 0.087 mg/L, Pb= 0.0025 mg/L and Chloride = 230 mg/L(US EPA 2023). The red line denotes the threshold which the $\boldsymbol{HQ_{aq} = 1}$, above which there may be increased risk to aquatic life.

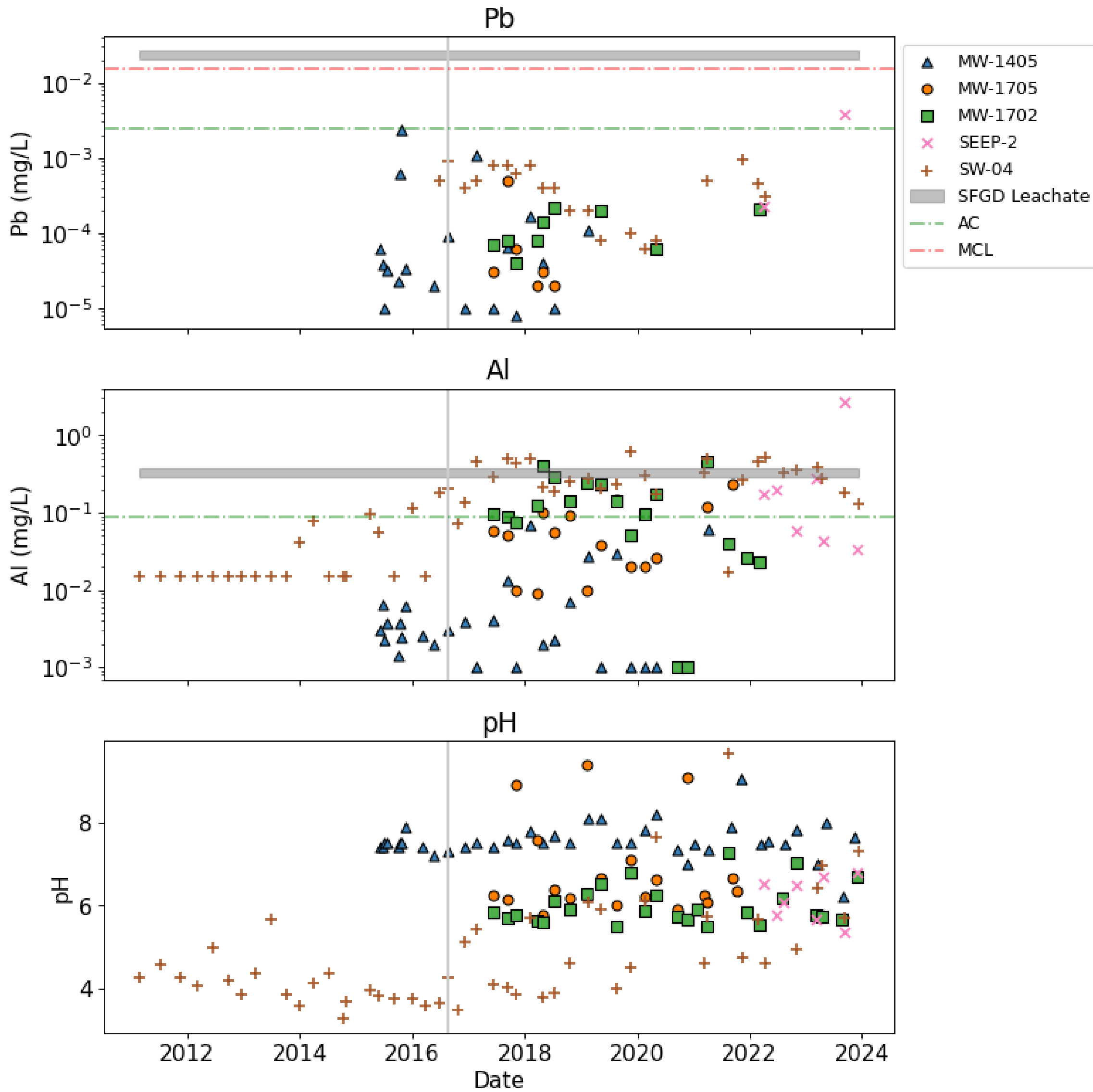

Figure 3-15: Risk due to Al and Pb in surface waters sampled downgradient of Phase III East at groundwater, seep, and surface water monitoring locations. The gray band denotes the parametric bootstrap mean +/- one parametric bootstrap standard deviation of sFGD leachate.

It is likely for sFGD to leach Al at concentrations that pose a risk to aquatic life ($HQ_{aq} > 1$). Factors of the soil and water determine the mobility and toxicity of Al to aquatic receptors. Al could exist in many forms that may negatively impact the reproduction and growth of aquatic organisms (Botté et al. 2022). sFGD is likely to leach Al at levels nearly four times greater than the AC (**Figure 3-14**). However, the speciation of Al is important to understand the extent to which Al could harm the aquatic system. Dissolved Al poses the greatest risk to aquatic life. Generally, Al solubility increases in acidic waters (Botté et al. 2022). In waters with a pH < 5.0, Al is mostly present as Al3+ (Botté et al. 2022). In alkaline waters (pH > 8.0) Al may be present as gibbsite and as $Al(OH)_4^-$ (Botté et al. 2022). However, even in waters with natural pH values (6.0-8.0), freshwater fish exhibit negative respiratory effects due to elevated Al (Botté et al. 2022). Additionally, the hardness of water-dissolved organic carbon (DOC), and temperature influence soluble Al and, therefore, the risk to aquatic systems (Botté et al. 2022). Given limited data on stream characteristics, we did not characterize the risk of Al in this work.

Elevated Al concentrations have been detected at SW-04 (**Figure 3 -15**). Further research should be conducted to evaluate the effect and source of the elevated Al. The increase in Al is accompanied by a rise in pH from acidic (pH ~4.2) before reclamation to neutral (pH~6). At a pH ~6, Al may be negatively impacting fish. In SW-04, elevated Al has stagnated around the expected values of Al sourced from sFGD (**Figure 3-15**). Alternatively, Al may be sourced from fluid interactions with exposed minerals and new groundwater flow paths caused by reclamation. The increased concentrations of Al may pose a risk to aquatic life and should be further evaluated. The green dotted line (**Figure 3-15**) denotes the AC for Al and TT for Pb. The gray vertical line denoted the start of Phase III East reclamation in August 2016.

3.4.3 Conclusion of Risk to Receptors of Phase III East Waters

The application of CCRs for the remediation of Phase III East has strongly impacted water quality in the shallow aquifer and subsequent surface streams (**Figure 3-16**). These impacts increase the risk to aquatic life in the perennial stream monitored by SW-04. For B, the Ohio EPA's acute and chronic aquatic criteria are 8.5 and 0.95 mg/L, both of which are exceeded in SW-04 observations since February 2018 and November 2022, respectively. Chronic exposure to B has been shown to reduce reproduction in aquatic life (Soucek, Dickinson, and Koch 2011). Additionally, if Al exists in certain conditions (pH, hardness, DOC, Ca, and Mg content), it may cause asphyxiation in freshwater fish (Sparling, Lowe, and Campbell 1997). The water quality downgradient of Phase III East poses a risk to aquatic life and should be further evaluated.

The deeper aquifer, known as the Clarion, has not shown any indication of impact from Phase III East reclamation (**Figures 3-17 and 3-18**). This aquifer serves the domestic wells in the community. MW-1408 has concentrations of As exceeding the MCL (**Figures 3-17 and 3-18**). This appears to be due to naturally occurring sources, as the concentrations do not significantly change before, during, or after reclamation. Human receptors ingesting well-water should not be impacted by reclamation of Phase III East with CCRs.

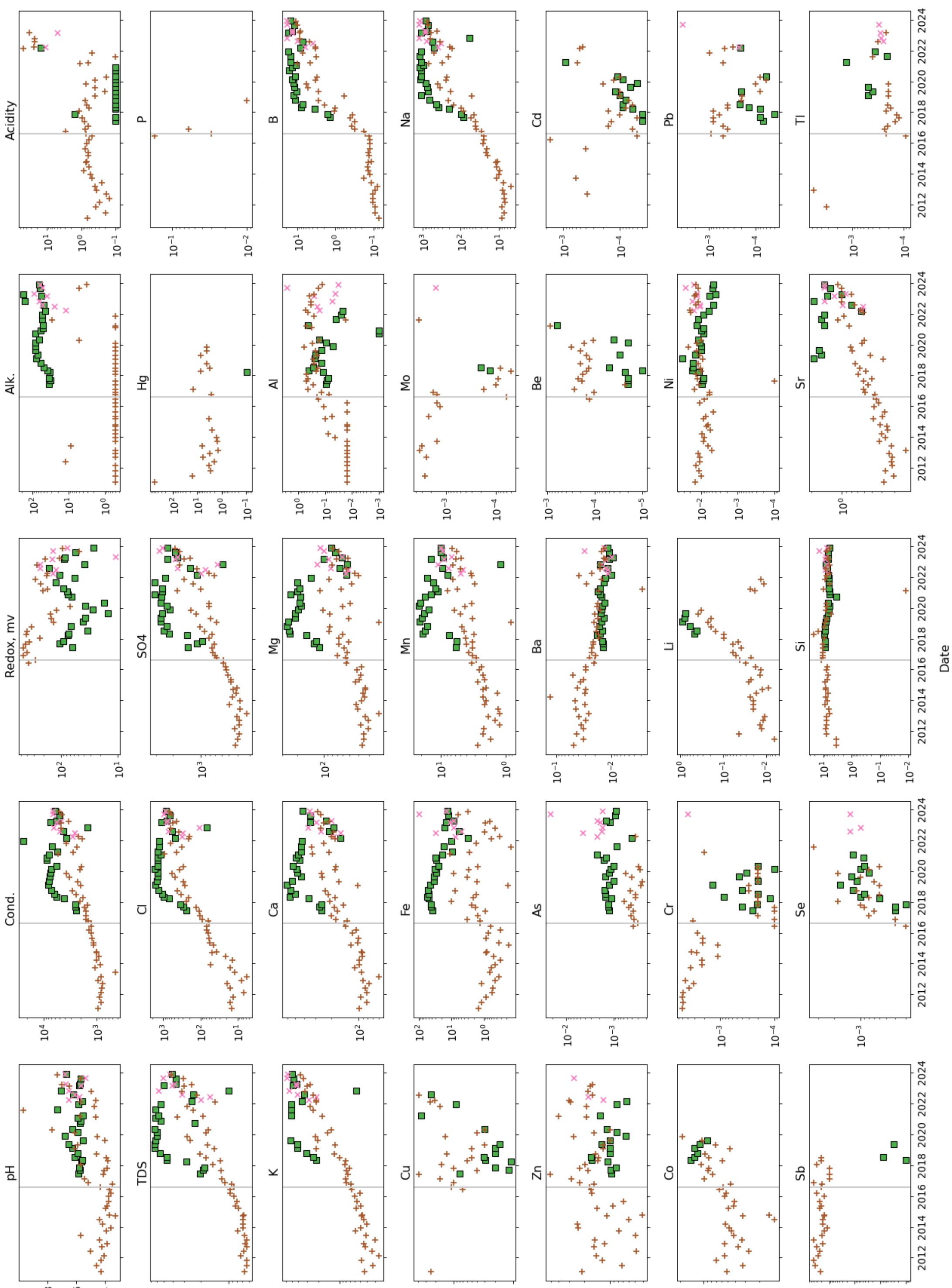

Figure 3-16. All recorded elemental observations for MW-1702 (square), SW-04 (x), and Seep-2 (+). Concentrations are shown on the y-axis and are in mg/L except for pH (S.U.) and Redox (mv)

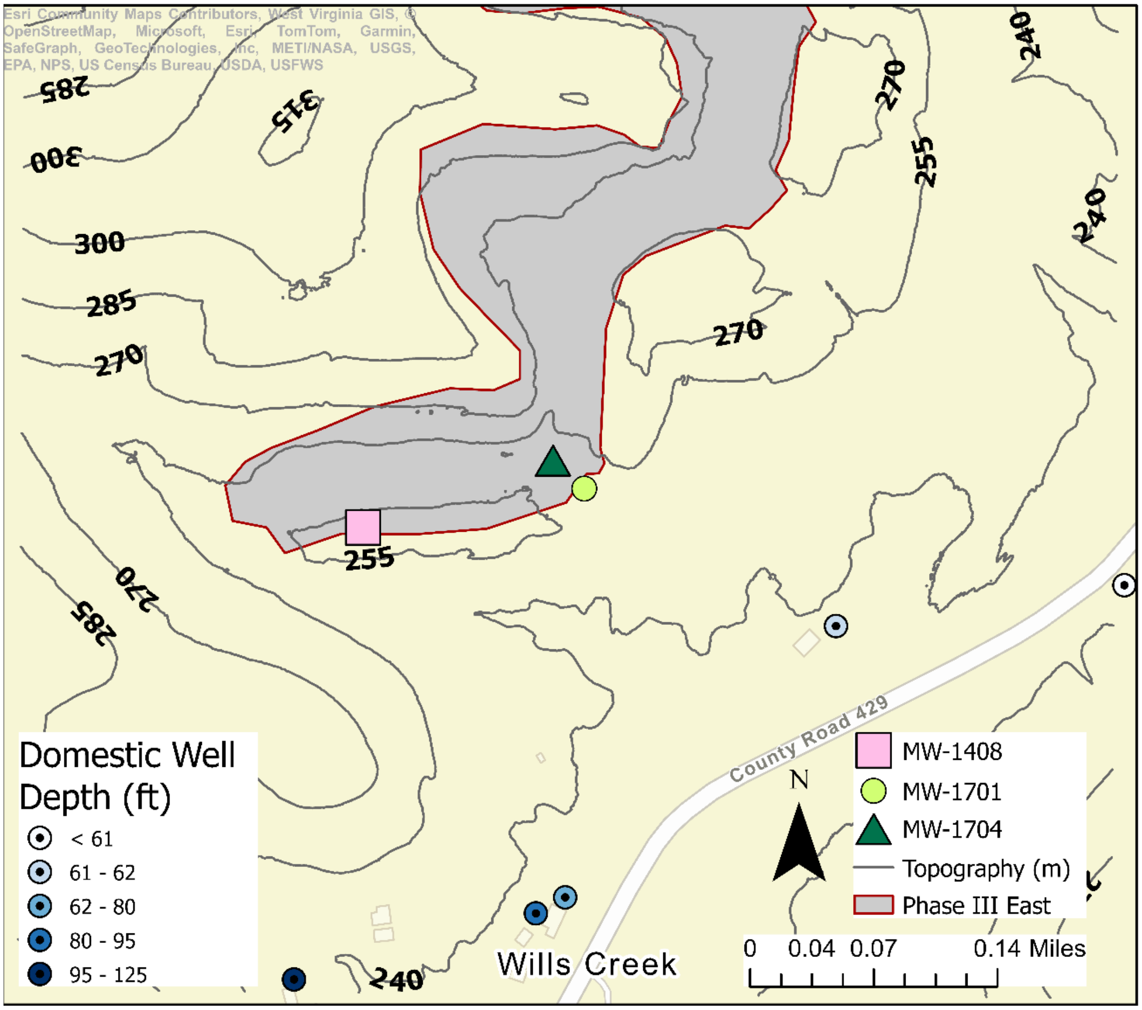

Figure 3-17. Map of Phase III East (red boundary) with monitoring wells in the Clarion aquifer (MW-1408, MW-1701, and MW-1704). MW-1408 was placed 110.4' below ground surface (bgs), MW-1701 at 63.2' bgs, and MW-1704 at 63.3' bgs. All three of these monitoring wells were situated in clarion sandstone Nearby domestic wells are shown as blue circles indicating depth bgs.

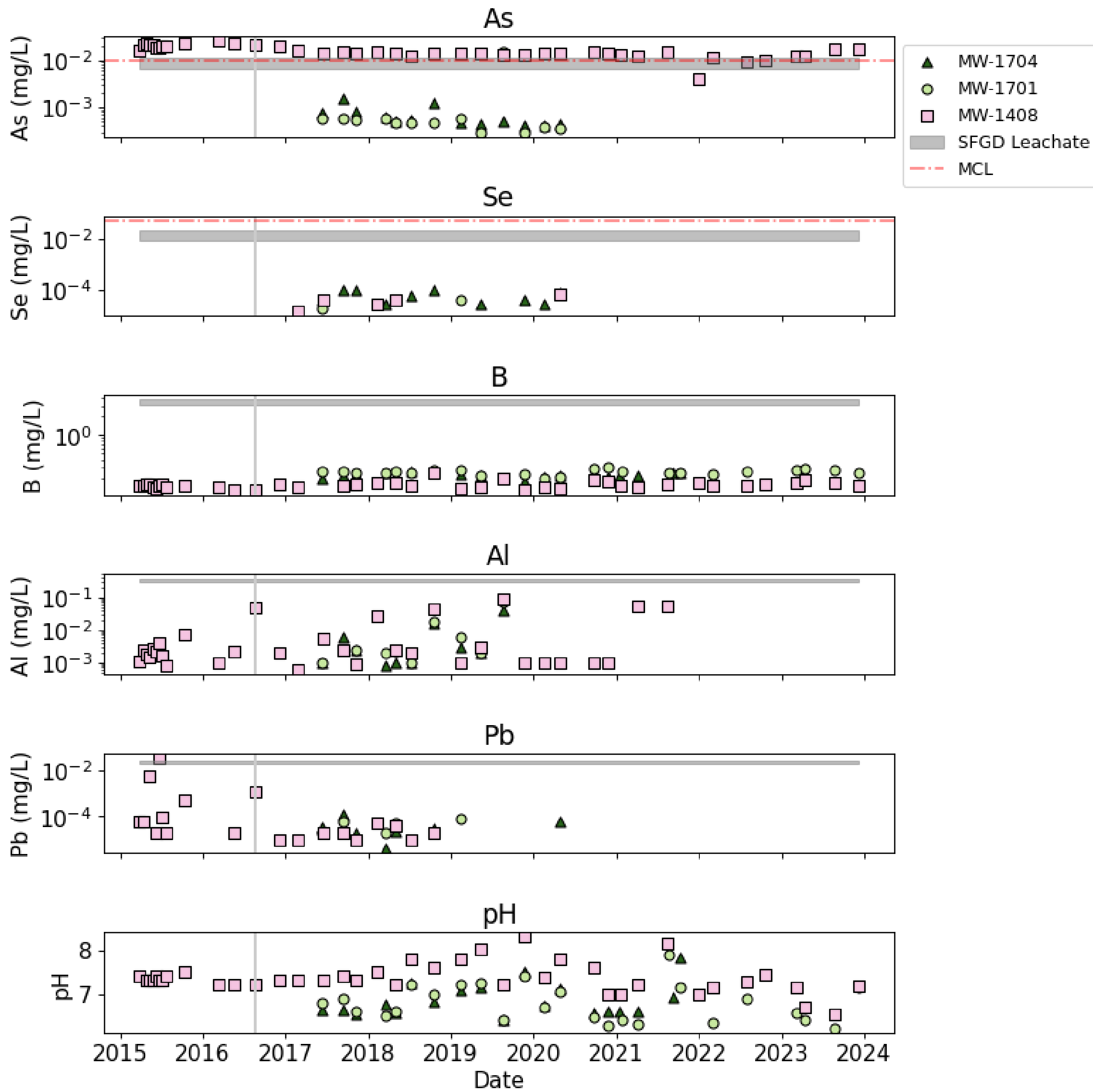

Figure 3-18. Clarion aquifer water quality with results of parametric bootstrap of sFGD concentration. The gray band denotes the expected leachate value +/- one standard deviation. The Clarion aquifer that serves the community's domestic wells does not appear to be impacted by reclamation.

<u>3.5 Limitations Work and Suggestions for Future Work</u>

This work involved (1) determining the likely leachate concentration with an interval-censored parametric bootstrapping approach, (2) developing a geochemical model with TOUGHREACT software, and (3) calibrating uncertain parameters of the geochemical model with BI.

All of these facilitated the risk assessment of reclaiming the AML in Conesville, OH with CCRs. Specifically, we explored the application and risk associated with using sFGD as a low-permeability barrier. Risk is quantified given water quality observations in multiple leaching experiments and at locations around Phase III East. We did not identify any immediate risk to human receptors because of reclamation. We did identify risks to aquatic life due to B in the surface water stream. Further research should determine any impacts of elevation trace elements in the perennial stream.

The assumptions and limitations of this work create an opportunity for further research. In the analysis of risk, we assumed homogeneity of materials. The CCR materials are likely heterogeneous, which may have altered the behavior of analyte composition in the column and SPLP experiments. Additionally, based on the column and SPLP leachate results, we assumed the data to fit a lognormal distribution, as suggested by previous research (Millard and Deverel 1988). This assumption may not hold for the measurements below the MDL and may differ for each element. The column and site model assumed a constant porosity, permeability, fluid flow rate, dispersion coefficient, and eluent composition. The site model simplified reality and assumed all As, Se, and B were sourced from sFGD as calibrated in the column model. This assumption neglects the potential contribution of As and Se from exposed arsenopyrite and coal-bearing minerals and the potential source of B from coal refuse or other CCRs. Additionally, the heterogeneity of the site environment was not captured by the simplification of this site model.

Additional research is recommended to distinguish further the signature of the plume observed by SW-04. Isotopic analysis of $\delta^{11}B$ and $^{87}Sr/^{86}Sr$ has been shown to determine CCR leachate waters (Harkness, Sulkin, and Vengosh 2016). From water quality data, we observe a linear correlation between B and Sr (**Figure 3-19)**. Further analysis of this correlation with isotopic analysis would determine if the plume at SW-04 contains CCR leachate. Analysis following Harkness et al. may indicate if CCRs have mixed with surface waters at SW-04 (Harkness, Sulkin, and Vengosh 2016). If isotopic analysis supports the presence of CCR leachate, action should be taken to limit the CCR leaching. This would reduce the risk of identified species that have exceeded or have the potential to exceed the AC in SW-04 (**Figures 3-15 and 3-16**). Regardless of the source, the water quality impacts of reclamation significantly impact the stream at SW-04 **(Figure 3-16)**. We suggest supplementing water quality monitoring with isotopic analysis and biological monitoring of stream life.

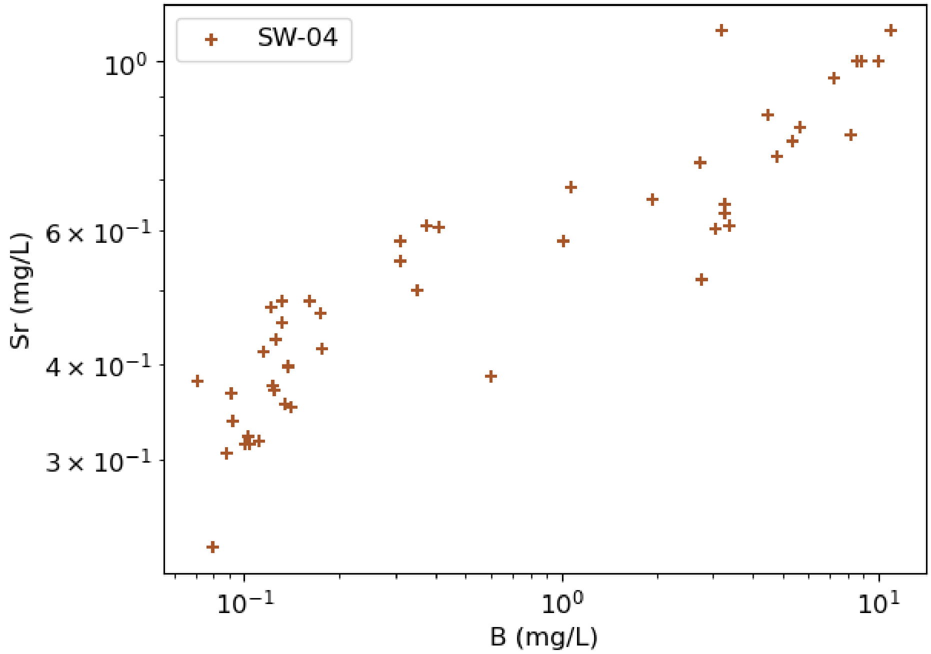

Figure 3-19. Correlation of B and Sr in SW-04 depicting a linear trend (R^2=0.77).

The geochemical reactive fate and transport model indicated the potential for sFGD to be the source of As, Se, and B in downgradient wells. The model is site-specific and calibrated on sFGD leachate from column leaching experiments. The model is a simplified representation of reality. The model simulated only the dissolution of calcium host phases and did not simulate the adsorption of As or Se onto iron oxides. Although not included in this analysis, the model may be expanded to include aqueous retardation, precipitation of selected iron oxides, surface complexation, cation exchange, and biodegradation (Xu 2008).

Calibration with BI should explore alternative host minerals of As and Se to understand the mechanisms that mobilize oxyanions into a solution. Our analysis explored one calcium host phase for As, $Ca_3(AsO_4)_2\ 4 \cdot H_2O$, but as noted by Wang et al., As may be modeled with $Ca_3(AsO_4)_2$, $Ca_3(AsO_4)_2 \cdot 3.66H_2O$, $Ca_4(OH)_2(AsO_4)_2 \cdot 4H_2O$, and $Ca_5(AsO_4)_3OH$.(X. Wang et al. 2022). Similarly, Wang et al. reported Se host phases to include possibly $Ca_3(OH)_2(SeO_3)_2$ and $Ca_3(OH)_2(SeO_4)_2$, in addition to the mineral we simulated, $CaSeO_3 \cdot 2H_2O$ (X. Wang et al. 2022). Our simulation of aqueous H_3BO_3 was a simplification of solid B phases existing on the surfaces of CCR particles. The simplification may be improved by suggesting a mineral host phase for B and calibrating equilibrium parameters to fit the column observations.

Our model assumed that all hydrogeologic parameters remained constant. This included porosity, groundwater flow, permeability, isotropic hydraulic conductivity, and dispersity. These inputs were derived from technical reports of the site and sFGD characteristics (Haley & Aldrich, Inc 2015; D. W. Hupe and J. A. Dziubek 1984). However, hydrogeologic parameters are often uncertain. The BI method described in this chapter should be applied to calibrate model performance given the uncertainties of these hydrogeologic parameters.

Calibration with BI was conducted on a high-performing Linux machine with UQLAB and TOUGHREACT software. UQLAB and TOUGHREACT software are parallelizable, which would lower computation time significantly, given a slower machine or a more complex model. Parallelization was not applied to this analysis as the TOUGHREACT column model ran in ~7 seconds, requiring ~3 days to converge the UQLAB analysis with 300 steps and 300 chains. However, calibrating more mineral parameters and a more complex model would cause the column model and UQLAB calibration to increase computation time. We suggest parallelization of TOUGHREACT and/or UQLAB. Given long computation times, an alternative to geochemical modeling is machine learning or surrogate models (He et al. 2022). It would be possible to train dynamic surrogate models, such as a long short-term memory (LSTM) network, to emulate the geochemical model and reduce simulation time. This method may capture the non-linear components of contaminant fate and transport and efficiently converge on uncertain parameters with BI (Yu, Wu, and Xiong 2022).

Column experiments were conducted with FA samples from Phase 3 East. However, FA was not included in this As and Se risk analysis because of the high MDL of ICP analysis. FA samples should be reanalyzed with AA. This research recommends analyzing As and Se with AA to ensure observations are above MDL. Given the scenario that FA is leaching from Phase 3 East, this would facilitate a risk assessment of FA leachate.

In conclusion, this risk assessment has determined, from water quality analysis and geochemical models, that there exists a possible risk to ecological systems due to CCR leachate at Conesville, OH. We observed pH neutralization at downgradient surface waters because of the reclamation of Phase 3 East with CCRs. We did not observe a reduction of Fe, Mn, and Al in downgradient surface waters as expected (**Figure 3-15**). This indicates that AMD may still impact SW-04. The stream quality at SW-04 appeared to have benefited from pH neutralization but is affected by elevated concentrations of multiple trace elements (**Figure 3-16)**. We observed elevated CCR indicator species: B, Ca, Cl, F, pH, sulfate, and TDS in downgradient ground, seep, and surface waters (**Figure 3-16)**. From this risk analysis, the concentrations of CCR leachate in groundwater do not pose a risk to human receptors. The aquatic life in the stream should be further analyzed for biological impacts of elevated B and other constituents of concern, as well as continued water quality monitoring.

Chapter 4: Geographic Information System (GIS) Siting Study

4.1 Introduction

The chapter identifies the location and data relating to hazardous land sites from abandoned mine regions as well as coal combustion residual (CCR) impoundments and flue-gas desulfurization (FGD) landfills with their corresponding coal combustion power stations. This data was identified and applied to the states of Indiana, Illinois, Ohio, Pennsylvania, and West Virginia. For each FGD and CCR site, a proximity analysis was used to determine the extent of hazardous land sites within a 25- and 50-mile radius to determine the feasibility and efficiency of utilizing each site for high-volume surface mine reclamation. The most relevant sites in each state were identified and investigated.

Ultimately, the practical and economic feasibility of these processes depends upon the geography and proximity of impoundments and landfills compared to the hazardous sites of interest. The quantity of material and the number of hazardous sites geographically close to the landfill or impoundment are relevant in determining which coal ash plants would be most useful to remove and excavate material. The GIS study focuses on determining the impoundments and landfills with the most hazardous sites within proximity. Then, the coal ash power plants corresponding to these best-located sites can be further analyzed for large-scale implementation of the project. Although this study includes only a certain region of the United States, the methods and procedures can be applied to any other region or state within the country.

4.2 Data Collection

It was important to first obtain the relevant data in order to run the proximity analyses. In this project, only the states of Indiana, Illinois, Ohio, Pennsylvania, and West Virginia have been analyzed. The goal of the data collection portion of the study was to obtain the coordinates and site-specific information of all coal ash impoundments, FGD landfills, corresponding coal power stations and abandoned coal mine sites listed as hazardous.

The Abandoned Mine Land Inventory System (AMLIS, 2023) is a useful database within the Office of Surface Mining Reclamation and Enforcement's (OSMRE) website. A shapefile containing the locations of all land hazards within the five relevant states has been downloaded from the database. The hazardous sites are categorized into dangerous high walls, high walls, and pits.

Obtaining the locations and information about coal ash impoundments and FGD landfills required several sources and extensive research. To organize and track progress, an Excel file and a Google Earth file were developed. The sources and methods used to populate these files are described below.

The USEPA maintains a list of CCR impoundments they assess for safety and stability (USEPA, 2023). The list includes names of impoundments with corresponding plant names and companies. However, it lacks location/coordinates, so a simple search was first required to locate all the listed coal power plant facilities. Then, using the company websites provided by USEPA Online Dataset, 2023, specifically the groundwater monitoring reports, the impoundments could be visually located and pinned on the Google Earth file to record and save the locations and coordinates of each. This initial process produced the majority of the data. However, this EPA source lacks information on FGD landfills and sites not being assessed.

Earthjustice (2023) provides a similar dataset that includes a map and spreadsheet of CCR rule compliance. This source is more comprehensive than the previous and would likely be more beneficial for initial data collection. It identifies most of the landfills not identified by the EPA's impoundment assessment list.

Finally, state environmental agencies were used to verify data. The Association of State and Territorial Solid Waste Management Officials provides links to each state's agency (ASTSWMO, 2023). This process was very different for each state with regard to the difficulty of obtaining information and the amount of data available. Contacting the relevant individuals within the agency was crucial for locating all available data needed to verify/update the dataset. The final data collection products include a spreadsheet with CCR impoundment and FGD landfill unit name, state, coordinates, corresponding power station, and whether it is active. A visual representation of the complete dataset is also available via Google Earth, shown in **Figures 4-1 to 4-3**.

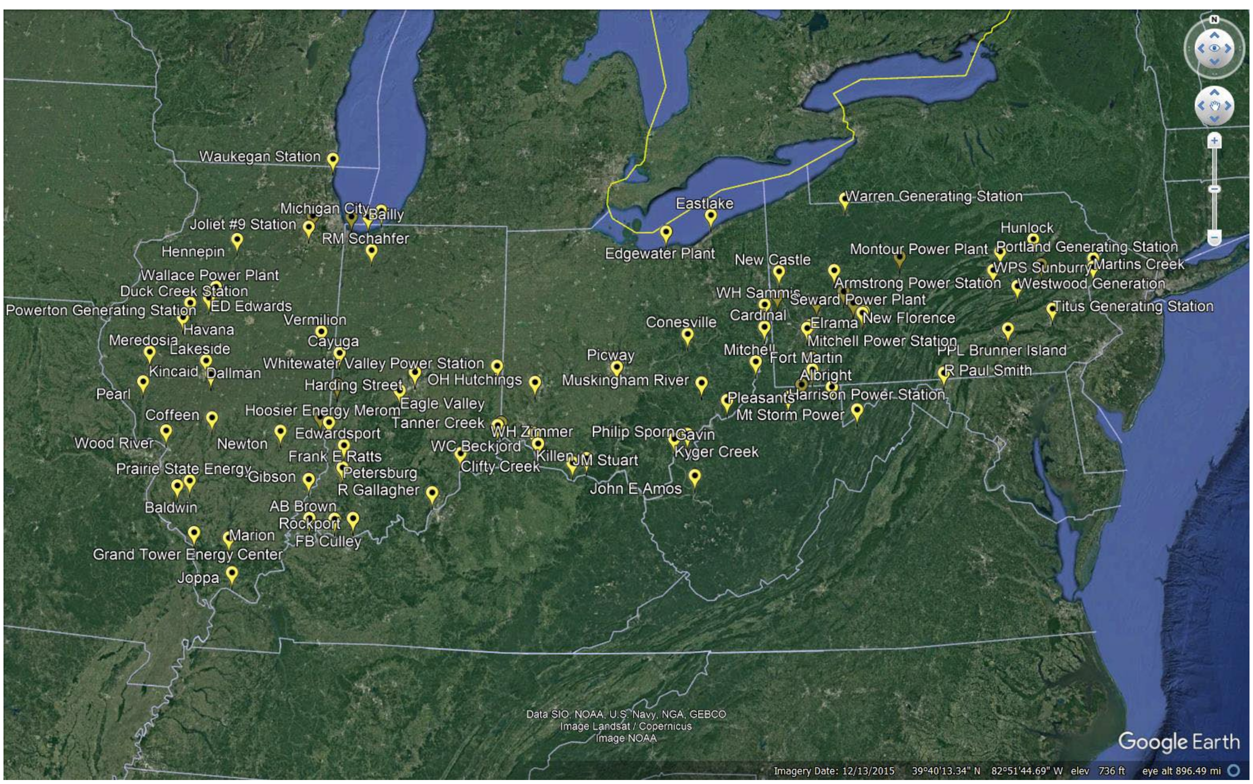

Figure 4-1. Google Earth Map of Coal Power Plants

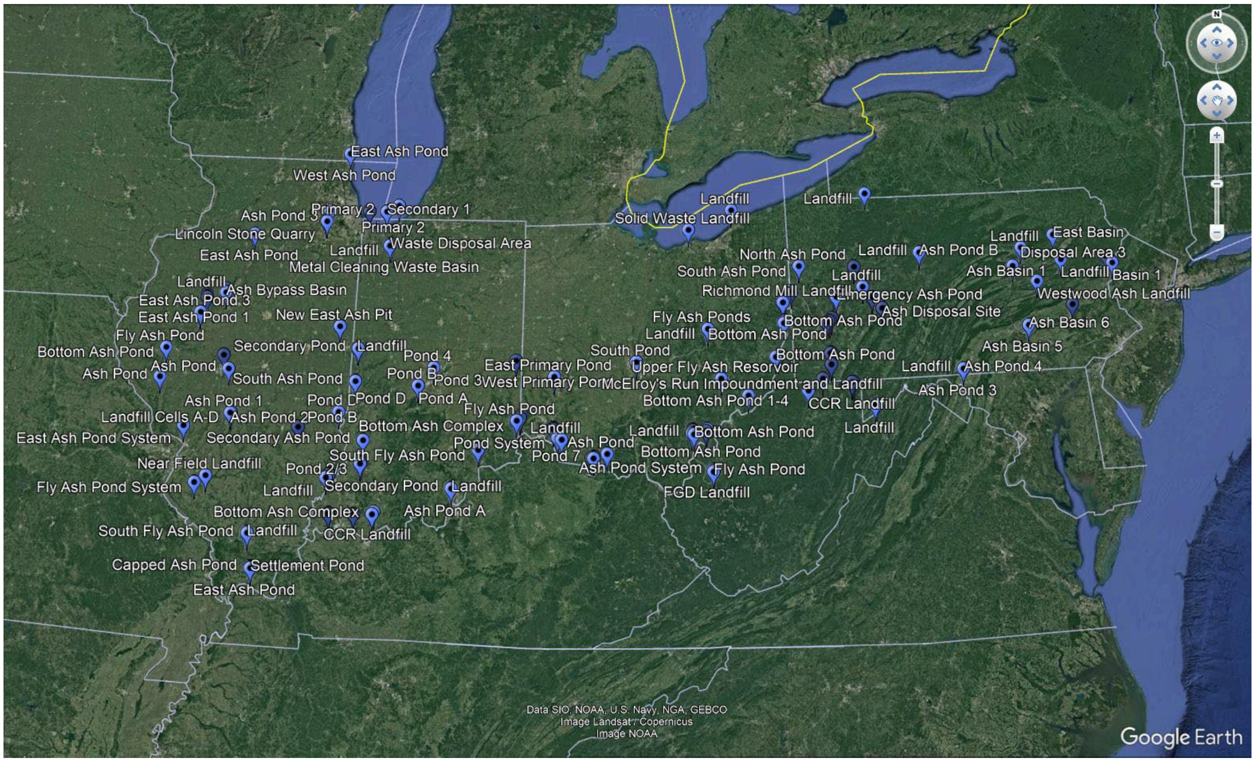

Figure 4-2. Google Earth Map of Impoundments and Landfills

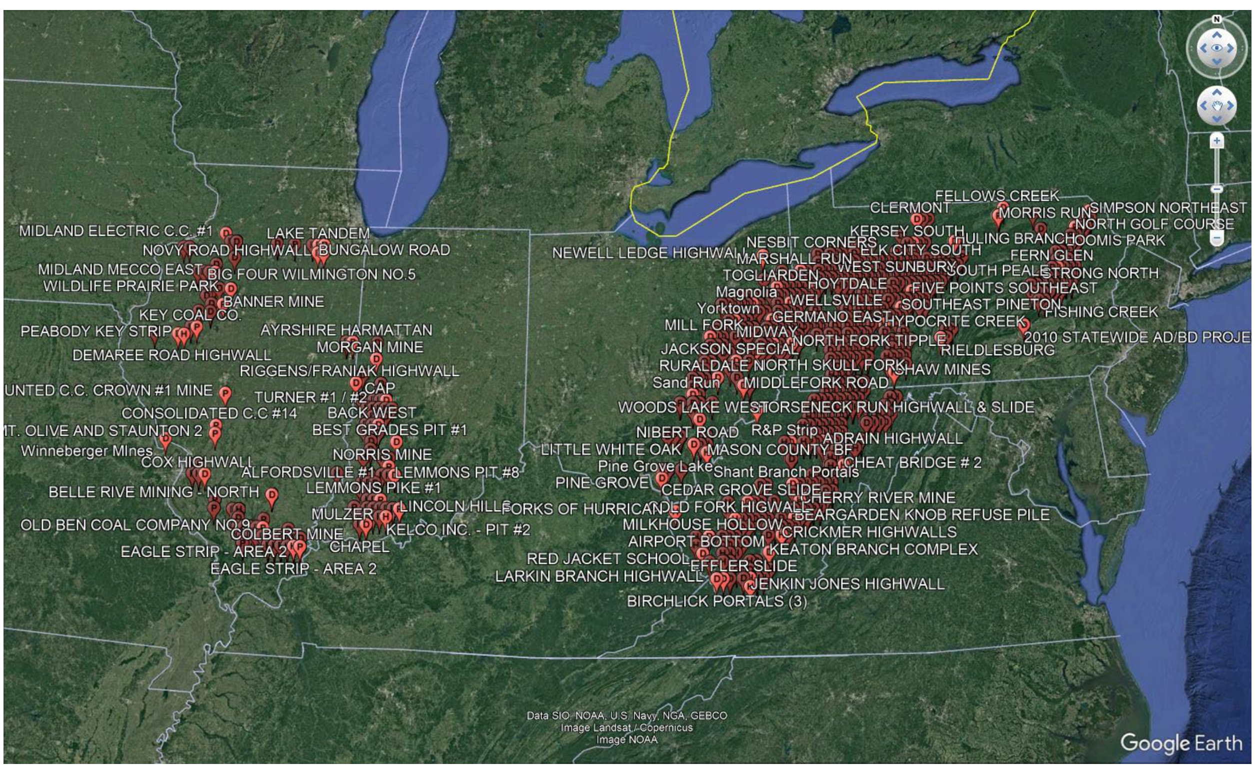

Figure 4-3. Google Earth Map of Pits, Highwalls, and Dangerous Highwalls

4.3 Data Analysis

The dataset described above was loaded into the ArcMap program by ArcGIS to create a comprehensive model for analysis. Five main data groups were used as inputs: power plants, impoundments/landfills, pits, highwalls, and dangerous highwalls.

Initially, the proximity analysis was intended to be applied to each impoundment or landfill unit. However, each unit is generally concentrated very closely together at the power plant site. Therefore, running the proximity analysis on the plant location alone was useful and sufficient.

After each data group was loaded into the model, 25- and 50-mile buffers were applied to the plant locations, as shown by the circles in **Figure 4-4.** The green dots represent the power plants, and the red pins represent the three types of hazards.

Using the intersect tool, the full extent of land hazards within the 25—and 50—mile buffer regions of each power plant was identified and recorded. Since there are two buffer distances and three types of land hazards, the function returned six sets of results that have been organized, condensed, and analyzed, as discussed in the next section.

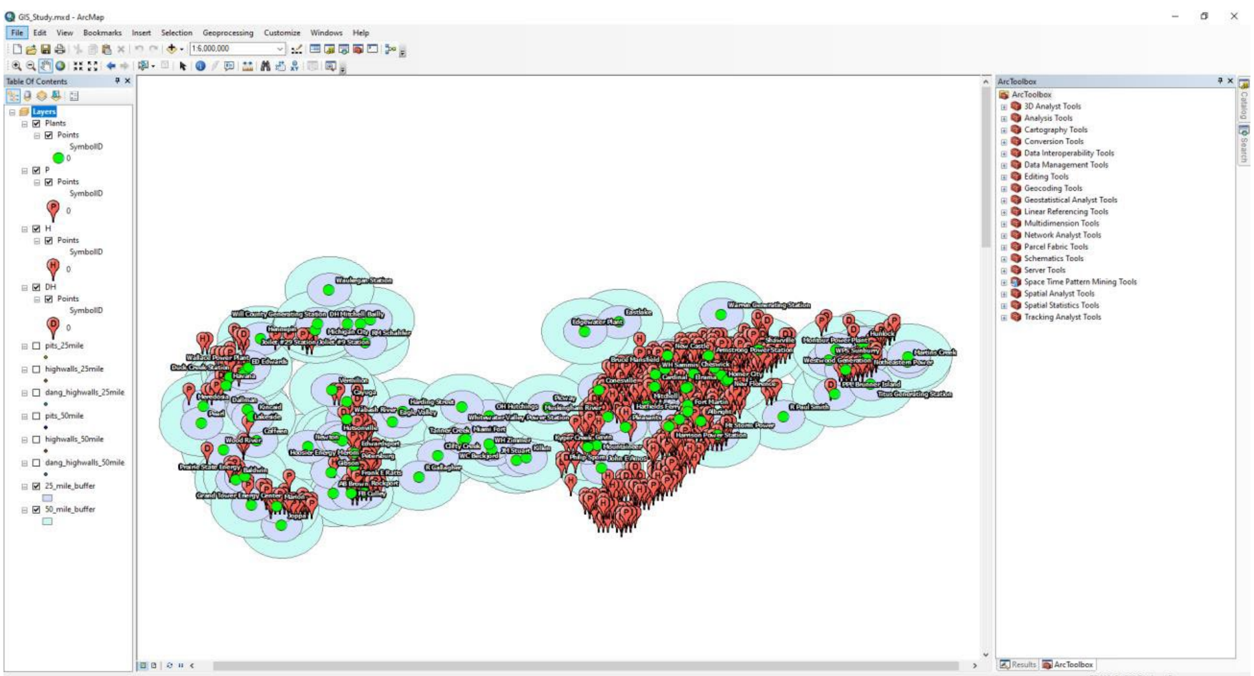

Figure 4-4. ArcMap Model with Buffer Areas

4.4. Reporting and Discussion of Results

In addition to the lengthy results spreadsheet produced by ArcMap, a spreadsheet was created to summarize the number of land hazards within each buffer distance for each power plant. The power plants were sorted from greatest to least number of total hazards within the 25- and 50-mile ranges to determine the most relevant plants and impoundments. **Table 4-1** displays the top 25 plants with the most total land hazards among all states. **Tables 4-2 to 4-6** display the same information for all power plants separated by state.

Table 4-1. Power Plants with the Most Total Land Hazards within 25- and 50-Miles

		Within 25 Miles			
Plant	State	Total Hazards	Dangerous Highwalls	Highwalls	Pits
Northeastern Power	PA	362	256	42	64
Rivesville	WV	340	158	177	5
Harrison	WV	304	110	190	4
Shawville	PA	288	255	19	14
Armstrong	PA	270	233	24	13
Albright	WV	267	131	133	3
Westwood	PA	257	171	49	37
Fort Martin	WV	254	135	117	2
WH Sammis	OH	230	175	50	5
Bruce Mansfield	PA	217	176	37	4
New Castle	PA	186	166	15	5
Cardinal	OH	179	118	53	8
Hunlock	PA	174	130	9	35
Shelocta (Keystone)	PA	161	132	22	7
Hatfields Ferry	PA	136	93	41	2
New Florence	PA	114	95	16	3
Seward	PA	112	93	16	3
Homer City	PA	99	83	13	3
Petersburg	IN	94	56	6	32
Frank E Ratts	IN	92	54	6	32
Cheswick	PA	89	75	11	3
Marion	IL	85	44	9	32
Elrama	PA	82	72	10	0
Rockport	IN	82	51	8	23
Edwardsport	IN	73	59	5	9

		Within 50 Miles			
Plant	State	Total Hazards	Dangerous Highwalls	Highwalls	Pits
Harrison	WV	824	340	473	11
Albright	WV	806	355	438	13
Rivesville	WV	795	345	437	13
Fort Martin	WV	719	349	359	11
Shelocta (Keystone)	PA	661	570	68	23
Cheswick	PA	658	537	100	21
Homer City	PA	628	536	69	23
Hatfields Ferry	PA	609	326	274	9
Bruce Mansfield	PA	583	477	81	25
Armstrong	PA	566	489	58	19
Seward	PA	540	456	62	22
Mitchell Power	PA	537	391	131	15
New Florence	PA	536	454	61	21
Shawville	PA	527	466	41	20
WH Sammis	OH	516	424	73	19
Mt. Storm	WV	508	227	274	7
Elrama	PA	502	375	113	14
Hunlock	PA	499	347	58	94
Northeastern Power	PA	474	329	60	85
Cardinal	OH	467	384	66	17
New Castle	PA	467	388	59	20
Montour	PA	450	307	63	80
Westwood	PA	424	291	60	73
WPS Sunbury	PA	391	266	58	67
Mitchell	WV	385	250	124	11

Table 4-2. Illinois Power Plants with the Most Total Land Hazards within 25- and 50-Miles

		Within 25 Miles			
Plant	Sta	Total Hazards	Dangerous Highwa	Highwalls	Pits
Marion	IL	85	44	9	32
Grand Tower	IL	20	9	2	9
Duck Creek	IL	18	11	2	5
ED Edwards	IL	15	10	2	3
Hutsonville	IL	15	14	0	1
Powerton	IL	15	10	2	3
Havana	IL	13	7	3	3
Baldwin	IL	11	4	1	6
Prairie State	IL	11	4	1	6
Joilet #9	IL	9	5	0	4
Joilet #29	IL	9	5	0	4
Hennepin	IL	8	6	1	1
Wallace	IL	7	4	1	2
Vermilion	IL	6	5	0	1
Coffeen	IL	2	0	0	2
Meredosia	IL	2	1	1	0
Wood River	IL	2	1	0	1
Dallman	IL	1	0	0	1
Kincaid	IL	1	0	0	1
Lakeside	IL	1	0	0	1
Will County	IL	1	1	0	0
Joppa	IL	0	0	0	0
Newton	IL	0	0	0	0
Pearl	IL	0	0	0	0

		Within 50 Miles			
Plant	State	Total Hazards	Dangerous Highwalls	Highwalls	Pits
Marion	IL	127	68	15	44
Hutsonville	IL	124	103	8	13
Joppa	IL	109	62	13	34
Grand Tower	IL	79	37	10	32
ED Edwards	IL	35	25	3	7
Wallace	IL	34	25	3	6
Prairie State	IL	32	10	3	19
Duck Creek	IL	31	20	4	7
Havana	IL	31	19	4	8
Baldwin	IL	30	10	3	17
Powerton	IL	30	19	4	7
Hennepin	IL	25	17	2	6
Joilet #9	IL	13	6	1	6
Joilet #29	IL	13	6	1	6
Wood River	IL	13	5	1	7
Vermilion	IL	10	9	0	1
Will County	IL	10	5	0	5
Meredosia	IL	8	4	1	3
Dallman	IL	6	2	1	3
Lakeside	IL	6	2	1	3
Coffeen	IL	5	0	0	5
Pearl	IL	4	2	1	1
Kincaid	IL	3	0	0	3
Newton	IL	1	0	1	0

Table 4-3. Indiana Power Plants with the Most Total Land Hazards within 25- and 50-Miles

		Within 25 Miles			
Plant	Sta	Total Hazards	Dangerous Highwa	Highwalls	Pits
Petersburg	IN	94	56	6	32
Frank E Ratts	IN	92	54	6	32
Rockport	IN	82	51	8	23
Edwardsport	IN	73	59	5	9
FB Culley	IN	69	45	7	17
Hoosier Merom	IN	69	61	2	6
Wabash River	IN	45	35	4	6
AB Brown	IN	11	6	1	4
Cayuga	IN	10	9	0	1
Gibson	IN	1	0	1	0
DH Mitchell	IN	0	0	0	0
Eagle Valley	IN	0	0	0	0
Harding Street	IN	0	0	0	0
R Gallagher	IN	0	0	0	0

		Within 50 Miles			
Plant	State	Total Hazards	Dangerous Highwalls	Highwalls	Pits
Frank E Ratts	IN	221	152	15	54
Petersburg	IN	221	152	15	54
Edwardsport	IN	220	159	13	48
AB Brown	IN	163	103	16	44
Gibson	IN	151	97	10	44
FB Culley	IN	149	91	12	46
Rockport	IN	149	91	11	47
Hoosier Merom	IN	136	110	10	16
Wabash River	IN	124	105	6	13
Eagle Valley	IN	76	62	5	9
Cayuga	IN	60	49	4	7
Harding Street	IN	19	16	1	2
R Gallagher	IN	2	1	0	1
DH Mitchell	IN	1	1	0	0

Table 4-4. Ohio Power Plants with the Most Total Land Hazards within 25- and 50-Miles

		Within 25 Miles			
Plant	Sta	Total Hazards	Dangerous Highwa	Highwalls	Pits
WH Sammis	OH	230	175	50	5
Cardinal	OH	179	118	53	8
Conesville	OH	49	44	4	1
Muskingham River	OH	49	32	13	4
Gavin	OH	40	27	7	6
Kyger Creek	OH	40	27	7	6
Eastlake	OH	0	0	0	0
Killen	OH	0	0	0	0
Picway	OH	0	0	0	0

		Within 50 Miles			
Plant	State	Total Hazards	Dangerous Highwalls	Highwalls	Pits
WH Sammis	OH	516	424	73	19
Cardinal	OH	467	384	66	17
Conesville	OH	231	198	21	12
Muskingham River	OH	155	122	22	11
Gavin	OH	99	66	18	15
Kyger Creek	OH	99	66	18	15
Picway	OH	28	19	3	6
Killen	OH	7	7	0	0
Eastlake	OH	3	2	1	0

Table 4-5. Pennsylvania Power Plants with the Most Total Land Hazards within 25- and 50-Miles

		Within 25 Miles			
Plant	Sta	Total Hazards	Dangerous Highwa	Highwalls	Pits
Northeastern Power	PA	362	256	42	64
Shawville	PA	288	255	19	14
Armstrong	PA	270	233	24	13
Westwood	PA	257	171	49	37
Bruce Mansfield	PA	217	176	37	4
New Castle	PA	186	166	15	5
Hunlock	PA	174	130	9	35
Shelocta (Keystone)	PA	161	132	22	7
Hatfields Ferry	PA	136	93	41	2
New Florence	PA	114	95	16	3
Seward	PA	112	93	16	3
Homer City	PA	99	83	13	3
Cheswick	PA	89	75	11	3
Elrama	PA	82	72	10	0
Mitchell Power	PA	73	67	6	0
WPS Sunbury	PA	65	44	14	7
Montour	PA	8	6	1	1
PPL Brunner Island	PA	5	5	0	0
Titus	PA	2	1	0	1
Martins Creek	PA	0	0	0	0
Portland	PA	0	0	0	0
Warren	PA	0	0	0	0

		Within 50 Miles			
Plant	State	Total Hazards	Dangerous Highwalls	Highwalls	Pits
Shelocta (Keystone)	PA	661	570	68	23
Cheswick	PA	658	537	100	21
Homer City	PA	628	536	69	23
Hatfields Ferry	PA	609	326	274	9
Bruce Mansfield	PA	583	477	81	25
Armstrong	PA	566	489	58	19
Seward	PA	540	456	62	22
Mitchell Power	PA	537	391	131	15
New Florence	PA	536	454	61	21
Shawville	PA	527	466	41	20
Elrama	PA	502	375	113	14
Hunlock	PA	499	347	58	94
Northeastern Power	PA	474	329	60	85
New Castle	PA	467	388	59	20
Montour	PA	450	307	63	80
Westwood	PA	424	291	60	73
WPS Sunbury	PA	391	266	58	67
Titus	PA	374	253	54	67
Portland	PA	226	164	10	52
Martins Creek	PA	183	138	6	39
PPL Brunner Island	PA	182	123	32	27
Warren	PA	37	34	3	0

Table 4-6. West Virginia Power Plants with the Most Total Land Hazards within 25- and 50-Miles

		Within 25 Miles			
Plant	Sta	Total Hazards	Dangerous Highwa	Highwalls	Pits
Rivesville	WV	340	158	177	5
Harrison	WV	304	110	190	4
Albright	WV	267	131	133	3
Fort Martin	WV	254	135	117	2
Mt. Storm	WV	70	28	38	4
Mitchell	WV	38	29	7	2
Mountaineer	WV	28	24	4	0
Philip Sporn	WV	28	24	4	0
Pleasants	WV	7	3	4	0
John E Amos	WV	3	1	2	0
R Paul Smith	WV	0	0	0	0

		Within 50 Miles			
Plant	State	Total Hazards	Dangerous Highwalls	Highwalls	Pits
Harrison	WV	824	340	473	11
Albright	WV	806	355	438	13
Rivesville	WV	795	345	437	13
Fort Martin	WV	719	349	359	11
Mt. Storm	WV	508	227	274	7
Mitchell	WV	385	250	124	11
Pleasants	WV	203	105	91	7
Mountaineer	WV	102	67	20	15
Philip Sporn	WV	99	65	19	15
John E Amos	WV	82	66	14	2
R Paul Smith	WV	22	13	4	5

It is important to note that the total number of dangerous highwalls is greater than the total number of highwalls which is greater than the total number of pits. Thus, the hazards are not weighted equally, and it could potentially be beneficial to sort the power plants with the highest number of specific hazards. However, at this point, the power plants with the most total hazards within 25 miles have been assumed to be the most relevant for further examination.

Illinois's most relevant power plant is the Marion Plant, shown in **Figure 4-5**. This is an active coal-fired power station owned by Southern Illinois Power Cooperative. The plant is located at 37.620556°N, 88.955°W in the southern part of the state. The site includes one FGD landfill and several distinct ash pond impoundments as shown on the graphic. Within 25 miles are 44 dangerous highwalls, 9 highwalls, and 32 pits. Most of these hazards are located directly north and east of the plant.

The Petersburg Generating Station is the plant with the most land hazards within the vicinity for the state of Indiana. This is a very large coal-fired power station owned by AES. The plant is located in southwest Indiana, at 38.529694°N, 87.247667°W. The site includes one FGD landfill and Ponds A, A', B, C, and D, as shown in **Figure 4-6.** It is also interesting to note that the Frank E. Ratts Generating Station, a retired coal-fired power station owned by Hoosier Energy, is only about one-mile southwest of the Petersburg Plant. Ponds 1-4 of this station could be utilized if more filler material is required. Within the 25-mile area are 56 dangerous high walls, 6 high walls, and 32 pits. Many of these are located south of the site, with some on the east and the north.

In Ohio, the power plant of interest is the W.H. Sammis Plant, located in Stratton on the state's eastern border at 40.531322°N, 80.631731°W. The large power plant, owned by Energy Harbor, is closing by the summer of 2023. The site includes two ash ponds, North and South, and two FGD landfills, Hollow Rock and Richmond Mill. The ponds are located at the plant, and the landfills are roughly two miles southwest as displayed in **Figure 4-7**. Within 25 miles of the site, there are 175 dangerous high walls, 50 high walls, and five pits, essentially in all directions, in OH, PA, and WV.

The most relevant power plant in Pennsylvania is the Shawville Generating Station. It is important to note that this site has been chosen for investigation because the site with the most land hazards within 25 miles in Pennsylvania, Northeastern Power, is a very small plant with only a small landfill and no ash ponds. The Shawville Station was a coal-fired power plant before being regenerated as a steam turbine generating station owned by GenOn Energy. The site includes two ash ponds and an FGD landfill. It is located in central Pennsylvania at 41.066778°N, -78.365833°W, and is shown in **Figure 4-8**. Within the 25-mile proximity there are 255 dangerous high walls, 19 high walls, and 14 pits surrounding the site, with a large portion being south of the plant.

West Virginia also includes several power plants with a very high number of hazards within proximity. The site determined most relevant in this state is the Albright Power Station, owned by the Monongahela Power Company and shown in **Figure 4-9**. This plant is located at 39.489694°N, 79.639389°W in northern West Virginia, and was retired in 2012. Unlike the two plants with the most land hazards within 25 miles, the Albright station includes two ash impoundments, the North and South Lagoons and its FGD landfill. There are 131 dangerous high walls, 133 high walls, and three pits within 25 miles of the plant, essentially in all directions. Due to the large number of land hazards in West Virginia, it could be beneficial to utilize FGD material from top sites that only include a landfill, paired with ash impoundments slightly further away from the hazards.

Figure 4-5. Marion Plant near Marion, Illinois

Figure 4-6. Petersburg Generating Station near Petersburg, Indiana

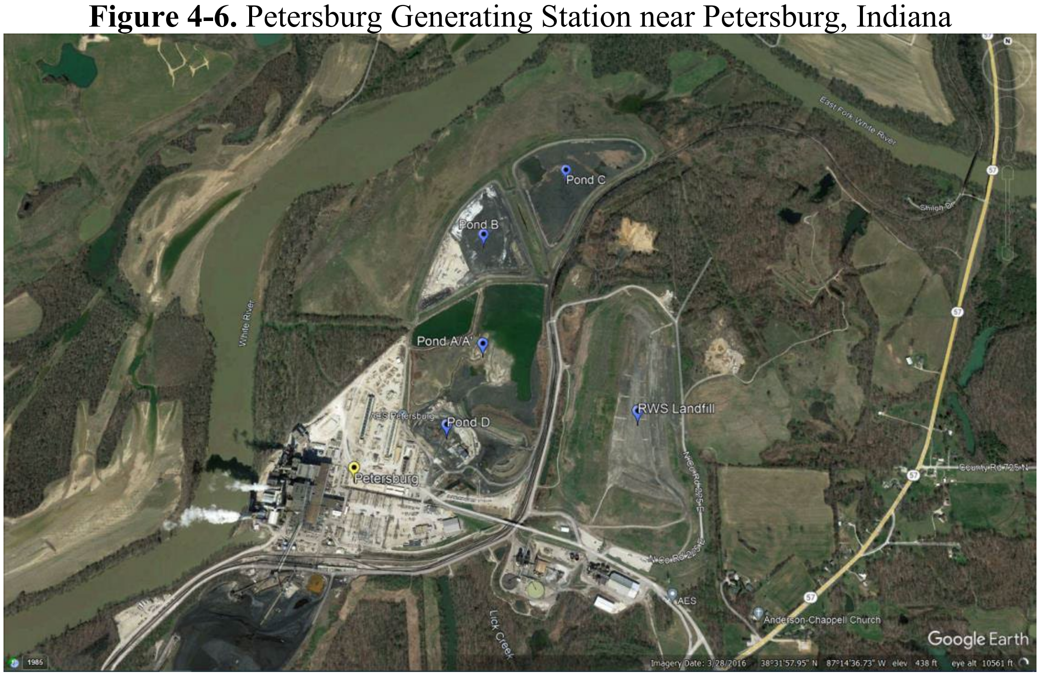

Figure 4-7. W.H. Sammis Plant near Stratton, Ohio

Figure 4-8. Shawville Generating Station near Shawville, Pennsylvania

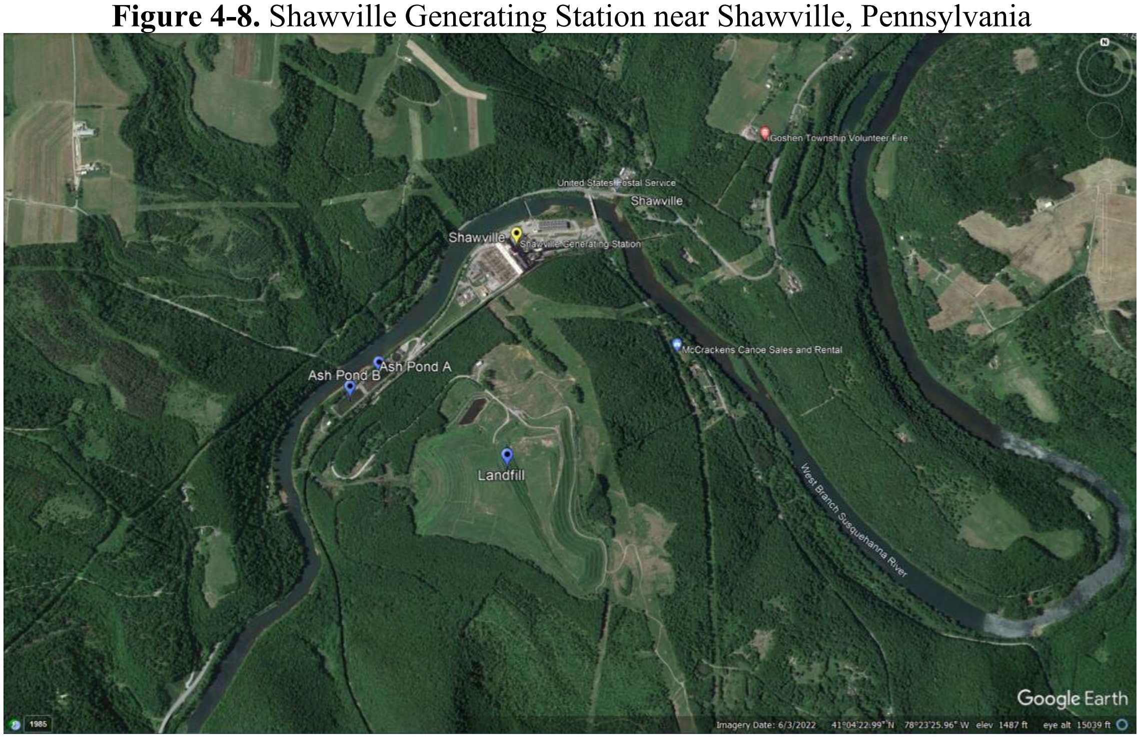

Figure 4-9. Albright Power Station near Albright, West Virginia

4.5 Summary

The results of this GIS Study support the notion that harvested ponded fly ash and landfilled FGD materials can be beneficially utilized for high-volume surface mine reclamation based on geography. Each state has several coal-fired power plants (current or retired) with a landfill and / ash impoundment, which can be applied to many abandoned mine land hazards. Assuming the engineering and logistics are feasible, it could be very practical to apply the processes of this project to several power plants in each state analyzed. Additionally, this GIS Study is applicable nationwide, to all states and regions with coal-fired power plants and abandoned coal mine land hazards.

Chapter 5: Conclusions

5.1 Work Accomplished

The overall motivation of this project was to demonstrate at laboratory, bench-scale, and full-scale demonstration levels that (a) coal ash surface impoundments can go through closure by removal as per USEPA and state regulations so that the material can be used as is (other than draining free water using CCRs piles) in high-volume beneficial applications, (b) FGD material from closed out FGD facilities can be excavated and recompacted for coal mine reclamation, and (c) harvested CCRs can be beneficially utilized (providing a net environmental gain) in large-volumes for reclamation at abandoned coal mine sites across the US, especially in the Eastern and Midwest coal mining regions.

The objectives of this project were to:

1) promote the safe and cost-effective closure by removal of coal ash impoundments,
2) harvest landfilled FGD, and
3) promote the high-volume beneficial use of these harvested CCRs in the reclamation of abandoned surface coal mine sites across the eastern and midwestern coal mining regions of the United States.

The primary tasks carried out for this project are summarized below:

1) **Conesville Full-Scale Demonstration Project:** About 2 million tons of harvested CCR materials from the closure by removal of an inactive fly ash pond and an adjacent old FGD landfill were used for the full-scale demonstration project to fully reclaim a nearby partially completed abandoned surface coal mine. Site monitoring for the project duration was carried out and results are discussed.
2) **Laboratory Testing:** Geotechnical and environmental testing of harvested ponded fly ash and landfilled FGD material at the former Conesville power plant were carried out. Completing the laboratory testing allowed for QA/QC for the full-scale site construction and informed the formulation of the risk analysis.
3) **Risk Analysis**: We developed a reliable computational model for fate and transport. We used these models and the rich set of monitored data for the Conesville site to analyze risks to human health and ecological risks associated with high-volume surface mine reclamation using harvested CCRs.
4) **GIS Siting Study:** A Geographic Information System (GIS) study was carried out for three states in the Eastern coal mining region and two in the Midwest coal region. This effort provided site-specific GIS information for five states and allowed us to establish protocols that other states can follow in implementing their own state-specific GIS studies.

5.2 Conclusions

Ground and surface water quality monitoring of the project site for a duration of 4 years indicates significant improvement of water quality at the site compared with baseline (pre-reclamation data) with some exceptions. None of the ground water samples exceeded the drinking water standards of Ba, Cd, Cr, Cu, Hg, Pb, Se, and F except for As. Groundwater samples collected from one well in the deep Clarion sandstone aquifer (MW-1408) reflected naturally occurring conditions. Comparably, MW-1407 also exceeded (0.011 mg/l) or was at the MCL threshold of 0.01 mg/l. Arsenic concentrations also spiked in Phase 3 West at MW-1507s with a corresponding increase in Fe concentrations despite the decreasing trends in TDS and other major indicator parameters.

Data collected indicated that the deep aquifer underlying the area remained unaffected by the reclamation. The Clarion Sandstone aquifer continued to exhibit low total dissolved solids and lower concentrations of major constituents, reflecting the fact that these monitoring wells were located close to the recharge area for this formation.

Water samples collected from the deep Clarion aquifer were more alkaline and contain less dissolved constituents such as Cl, sulfate, Ca, Mg, Fe, Na, and Mn, than the samples from the disturbed shallow perched water table. Compared to the sandstone layer in the deep Clarion aquifer, the water in the limestone layer has higher pH, alkalinity, B, and Na (i.e. a sodium bicarbonate type water characteristic of recharge seeping through the overlying shale layers).

The background concentrations of Na, Cl, B, and TDS measured before Phase III preparation occurred in late 2015 have increased at some of the surface water sampling points (such as SW-04 and SW-3). Variations in Na, Cl, B, and TDS concentrations also exhibit much greater variability when compared to pre-reclamation values, suggesting variations in input, flow, or both. Maximum values for Na, B, and TDS were recorded in the 2023 sampling. Preliminary analyses of leaching site material under a simulated rainfall scenario using laboratory columns show rapid initial release of soluble constituents (e.g. Na, Cl, Ca). Concentrations of these constituents were observed to decrease quickly overextended leaching time. The trends of Na and Cl from only one groundwater monitoring well (MW-1702) show increased concentration after reclamation begins, which continues to rise. Even though USEPA does not have aquatic life criteria for Na or TDS however, we have observed a significant increase of Na and TDS at one surface water sampling point a typical (SW-4). Concentrations of copper have stayed below the ecological risk benchmark, but those for Cl and B do not and show an apparent increase above the threshold after reclamation began. Because of the variability of the results, more analyses and possibly sampling of SW-04 are needed to determine better their potential to cause ecological impacts.

We did not identify any immediate risk to human receptors because of reclamation. This research applied statistical methods to characterize the human and ecological health risks of CCR leachate in the environment. The site water quality and experimental leachate data were evaluated with parametric bootstrapping and used to develop and calibrate a geochemical reactive fate and transport model. First, we identified the species of concern from the results of the column and synthetic precipitation leaching procedure (SPLP) experiments. These species were identified by incorporating censored data in our parametric bootstrapped mean analysis. The results delineated the distribution of the expected leachate composition. To identify the species of concern that leach from the CCR used in the Conesville reclamation, we calculated the non-cancer hazard quotient (HQ), the risk due to a carcinogen (C_{risk}), ecological hazard quotient (HQ_{eco}), and compared concentrations to the US EPA max contaminant level (MCL) for drinking water. Species exceeding these thresholds were targeted for geochemical modeling. The geochemical model, resembling Phase III East, predicts future concentrations of these species in shallow groundwater. The geochemical model was calibrated with Bayesian Inversion, a technique that produces a range of likely uncertain input parameters. Our results indicate the potential for Se and B to leach from stabilized flue gas desulfurization (sFGD) above the chronic aquatic health criteria and As to pose increased cancer risk in a lab setting. However, in a field application, we do not observe elevated risk of As and Se to human or ecological systems. At the site in Conesville, OH, B may pose a risk to ecological systems and may be sourced from the CCRs placed in the abandoned mine land (AML), alterations in groundwater flow (unrelated to CCR use), or other site minerals

The results of this GIS study carried out in this project supports the notion that harvested ponded fly ash and landfilled FGD materials can be beneficially utilized for high-volume surface mine reclamation based on geography. Each state has several coal-fired power plants (current or retired) with a landfill and / ash impoundment, which can be applied to many abandoned mine land hazards. Assuming the engineering and logistics are feasible, it could be very practical to apply the processes of this project to several power plants in each state analyzed. Additionally, this GIS Study is applicable nationwide, to all states and regions with coal-fired power plants and abandoned coal mine land hazards.

5.3 Limitations of Work and Suggestions for Future Work

Data collected from the monitoring network at the full-scale reclamation site will continue to be analyzed to assess the impacts of reclamation activities on the water quality of the nearby surface waters and underlying aquifers.

We did not identify any immediate risk to human receptors because of reclamation, but we did identify risks to aquatic life due to B in the surface water stream. Further research should determine any impacts of elevation trace elements in the perennial stream.

The assumptions and limitations of this work create an opportunity for further research. In the analysis of risk, we assumed homogeneity of materials. The CCR materials are likely heterogeneous, which may have altered the behavior of analyte composition in the column and leaching experiments.

We assumed the data to fit a lognormal distribution, as suggested by previous research. This assumption may not hold for the measurements below the MDL and may differ for each element.

The column and site model assumed a constant porosity, permeability, fluid flow rate, dispersion coefficient, and eluent composition. The site model simplified reality and assumed all As, Se, and B were sourced from sFGD as calibrated in the column model. This assumption neglects the potential contribution of As and Se from exposed arsenopyrite and coal-bearing minerals and the potential source of B from coal refuse or other CCRs. Additionally, the heterogeneity of the site environment was not captured by the simplification of this site model.

Additional research is recommended to distinguish further the signature of the plume observed by SW-04. Isotopic analysis of $\delta^{11}B$ and $^{87}Sr/^{86}Sr$ has been shown to determine CCR leachate waters. We suggest supplementing water quality monitoring with isotopic analysis and biological monitoring of stream life.

The geochemical reactive fate and transport model indicated the potential for sFGD to be the source of As, Se, and B in downgradient wells. The model is site-specific and calibrated on sFGD leachate from column leaching experiments. The model is a simplified representation of reality. The model simulated only the dissolution of calcium host phases and did not simulate the adsorption of As or Se onto iron oxides. Although not included in this analysis, the model may be expanded to include aqueous retardation, precipitation of selected iron oxides, surface complexation, cation exchange, and bio-degradation.

Calibration with BI should explore alternative host minerals of As and Se to understand the mechanisms that mobilize oxyanions into a solution. Our simulation of aqueous H_3BO_3 was a simplification of solid B phases existing on the surfaces of CCR particles. The simplification may be improved by suggesting a mineral host phase for B and calibrating equilibrium parameters to fit the column observations.

Our model assumed that all hydrogeologic parameters remained constant. This included porosity, groundwater flow, permeability, isotropic hydraulic conductivity, and dispersity. These inputs were derived from technical reports of the site and sFGD characteristics. However, hydrogeologic parameters are often uncertain. The BI method described in this work should be applied to calibrate model performance given the uncertainties of these hydrogeologic parameters.

Calibration with BI was conducted on a high-performing Linux machine with UQLAB and TOUGHREACT software. UQLAB and TOUGHREACT software are parallelizable, which would lower computation time significantly, given a slower machine or a more complex model. Parallelization was not applied to this analysis as the TOUGHREACT column model ran in ~7 seconds, requiring ~3 days to converge the UQLAB analysis with 300 steps and 300 chains. However, calibrating more mineral parameters and a more complex model would cause the column model and UQLAB calibration to increase computation time. We suggest parallelization of TOUGHREACT and/or UQLAB. Given long computation times, an alternative to geochemical modeling is machine learning or surrogate models. It would be possible to train dynamic surrogate models, such as a long short-term memory (LSTM) network, to emulate the geochemical model and reduce simulation time. This method may capture the non-linear components of contaminant fate and transport and efficiently converge on uncertain parameters with BI.

Column experiments were conducted with FA samples from Phase 3 East. However, FA was not included in this As and Se risk analysis because of the high MDL of ICP analysis. FA samples should be reanalyzed with AA. This research recommends analyzing As and Se with AA to ensure observations are above MDL.

References

Al-Abed, Souhail R., Gautham Jegadeesan, Kirk G. Scheckel, and Thabet Tolaymat. 2008. "Speciation, Characterization, and Mobility of As, Se, and Hg in Flue Gas Desulphurization Residues." Environmental Science & Technology 42 (5): 1693–98. https://doi.org/10.1021/es702479n.

Allison, Jerry D., David S. Brown, and Kevin J. Novo-Gradac. 1991. MINTEQA2/PRODEFA2, a Geochemical Assessment Model for Environmental Systems: Version 3.0 User's Manual. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency.

American Coal Ash Association. 2022. "2022 Coal Combustion Product (CCP) Production and Use Survey Results." 2022. https://acaa-usa.org/wp-content/uploads/2023/12/2022-Production-and-Use-Survey-Results-FINAL.pdf.

AMLIS, Abandoned Mine Land Inventory System. Office of Surface Mining Reclamation and Reinforcement. https://amlis.osmre.gov/. Accessed January 31, 2023.

Asante-Duah, Kofi. 2002. Public Health Risk Assessment for Human Exposure to Chemicals. New York, NY: Springer Science+Business Media.

ASTSWMO, State and Territorial Websites. ASTSWMO. https://astswmo.org/state-and-territorial-resources/. Accessed January 31, 2023.

ATSDR. 2022. "Calculating Hazard Quotients and Cancer Risk Estimates." April 12, 2022. https://www.atsdr.cdc.gov/pha-guidance/conducting_scientific_evaluations/epcs_and_exposure_calculations/hazardquotients_cancerrisk.html.

Botté, Audrey, Mariem Zaidi, Joelle Guery, Denis Fichet, and Vincent Leignel. 2022. "Aluminium in Aquatic Environments: Abundance and Ecotoxicological Impacts." Aquatic Ecology 56 (September). https://doi.org/10.1007/s10452-021-09936-4.

Chen, Liming, Dave Kost, Yongqiang Tian, Xiaolu Guo, Dexter Watts, Darrell Norton, Richard P. Wolkowski, and Warren A. Dick. 2014. "Effects of Gypsum on Trace Metals in Soils and Earthworms." Journal of Environmental Quality 43 (1): 263–72. https://doi.org/10.2134/jeq2012.0096.

Cheng, Chin-Min, Harold W. Walker, and Jerry M. Bigham. 2007. "Mechanisms Controlling the Leaching Kinetics of Fixated Flue Gas Desulfurization (FGD) Material under Neutral and Acidic Conditions." Journal of Environmental Quality 36 (3): 874–86. https://doi.org/10.2134/jeq2006.0327.

Cheng, Chin-Min, Maria Amaya, Tarunjit Butalia, Robert Baker, Harold W. Walker, John Massey-Norton, and William Wolfe. 2016. "Short-Term Influence of Coal Mine Reclamation Using Coal Combustion Residues on Groundwater Quality." Science of The Total Environment 571 (November): 834–54. https://doi.org/10.1016/j.scitotenv.2016.07.061.

Cheng, Chin-Min, Tarunjit Butalia, Robert Baker, Justin Jent, and William Wolfe. 2021. "Using Coal Combustion Residues for Abandoned Coal Mine Reclamation."

Clark, E.V., Daniels, L.W, Zipper, C.E., Eriksson, K. (2018). Mineralogical influences on water quality from weathering of surface coal mine spoils, *Applied Geochemistry*, 91, 97-106

Cox, James A, Gary L Lundquist, Andrzej Przyjazny, and C David Schmulbach. 1978. "Leaching of Boron from Coal Ash."

D. W. Hupe and J. A. Dziubek. 1984. "Monitoring the Fixed FGD Sludge Landfill_Conesville, Ohio: CS-3702." Research Project 1406-2. Palo Alto, California: prepared for Electric Power Research Institute. https://www.osti.gov/servlets/purl/5602681.

Davidson-Pilon, Cameron. 2019. "Lifelines: Survival Analysis in Python." Journal of Open Source Software 4 (40): 1317. https://doi.org/10.21105/joss.01317.

Deonarine, Amrika, Grace E. Schwartz, and Laura S. Ruhl. 2023. "Environmental Impacts of Coal Combustion Residuals: Current Understanding and Future Perspectives." Environmental Science & Technology 57 (5): 1855–69. https://doi.org/10.1021/acs.est.2c06094.

Earth Justice, Mapping the Coal Ash Contamination. Earthjustice. https://earthjustice.org/features/coal-ash-contaminated-sites-map. Published November 3, 2022. Accessed January 31, 2023.

Fonseca, B., H. Figueiredo, J. Rodrigues, A. Queiroz, and T. Tavares. 2011. "Mobility of Cr, Pb, Cd, Cu and Zn in a Loamy Sand Soil: A Comparative Study." Geoderma 164 (3): 232–37. https://doi.org/10.1016/j.geoderma.2011.06.016.

Fu, Yanrong, Kun He, Chunliang Zhou, and Yumei Mao. 2020. "Improvement of Saline-Alkaline Soil via Flue Gas Desulfurization Gypsum and Safety Analysis of the Associated Heavy Metals." Journal of Physics.

George, Barbara Jane, Leslie Gains-Germain, Kristin Broms, Kelly Black, Marschall Furman, Michael D. Hays, Kent W. Thomas, and Jane Ellen Simmons. 2021. "Censoring Trace-Level Environmental Data: Statistical Analysis Considerations to Limit Bias." Environmental Science & Technology 55 (6): 3786–95. https://doi.org/10.1021/acs.est.0c02256.

Goodman, Jonathan, and Jonathan Weare. 2010. "Ensemble Samplers with Affine Invariance." Communications in Applied Mathematics and Computational Science 5 (1): 65–80.

Haefner, Ralph J. 2002. "Water Quality and Geochemical Modeling of Water at an Abandoned Coal Mine Reclaimed With Coal Combustion By-Products." U.S. Geological Survey Water-Resources Investigations Report 02-4216.

Haley & Aldrich, Inc. 2015. "Calculations of Groundwater 5-Yr Travel Time." Calculations. Conesville Five Points Phase III.

Harkness, Jennifer S., Barry Sulkin, and Avner Vengosh. 2016. "Evidence for Coal Ash Ponds Leaking in the Southeastern United States." Environmental Science & Technology 50 (12): 6583–92. https://doi.org/10.1021/acs.est.6b01727.

He, Yuyang, You Zhou, Tao Wen, Shuang Zhang, Fang Huang, Xinyu Zou, Xiaogang Ma, and Yueqin Zhu. 2022. "A Review of Machine Learning in Geochemistry and Cosmochemistry: Method Improvements and Applications." Applied Geochemistry 140 (May): 105273. https://doi.org/10.1016/j.apgeochem.2022.105273.

Izquierdo, Maria, and Xavier Querol. 2012. "Leaching Behaviour of Elements from Coal Combustion Fly Ash: An Overview." International Journal of Coal Geology, Minerals and Trace Elements in Coal, 94 (May): 54–66. https://doi.org/10.1016/j.coal.2011.10.006.

Jin, Zehao, Jie Ren, Nelson A. Rivera, James C. Hower, and Heileen Hsu-Kim. 2023. "Functional Predictor Variables for the Leaching Potential of Arsenic and Selenium from Coal Fly Ash." ACS ES&T Water 3 (4): 1105–15. https://doi.org/10.1021/acsestwater.2c00568.

Kravchenko, Julia, and Laura S. Ruhl. 2021. "Coal Combustion Residuals and Health." In Practical Applications of Medical Geology, edited by Malcolm Siegel, Olle Selinus, and Robert Finkelman, 429–74. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-53893-4_14.

Lamminen, Mikko, James Wood, Harold Walker, Yu-Ping Chin, Yongtian He, and Samuel J. Traina. 2001. "Effect of Flue Gas Desulfurization (FGD) By-Product on Water Quality at an Underground Coal Mine." Journal of Environmental Quality 30 (4): 1371–81. https://doi.org/10.2134/jeq2001.3041371x.

Lasaga, A. C. 1981. "Transition State Theory." Rev. Mineral.; (United States) 8 (January). https://www.osti.gov/biblio/6251195.

Mao, Yumei, Xiaoping Li, Warren A. Dick, and Linkui Cao. 2023. "Use of Flue Gas Desulfurization Gypsum to Reduce Dissolved Phosphorus in Runoff and Leachate from Two Agricultural Soils." Soil Ecology Letters 5 (1): 128–36. https://doi.org/10.1007/s42832-022-0135-5.

Marelli, Stefano, and Bruno Sudret. 2014. "UQLab: A Framework for Uncertainty Quantification in Matlab," July, 2554–63. https://doi.org/10.1061/9780784413609.257.

Millard, Steven P., and Steven J. Deverel. 1988. "Nonparametric Statistical Methods for Comparing Two Sites Based on Data with Multiple Nondetect Limits." Water Resources Research 24 (12): 2087–98. https://doi.org/10.1029/WR024i012p02087.
Moran, S. (2018). Clean water characterization and treatment objectives. *An Applied Guide to Water and Effluent Treatment Plant Design; Elsevier: Amsterdam, The Netherlands*, 61-67.
NRC, *Managing Coal Combustion Residues in Mines*, Committee on Mine Placement of Coal Combustion Wastes, National Research Council, National Academy of Science, 2006
Ohio Department of Natural Resources. n.d. "Abandoned Mine Lands Reclamation Programs." Ohio Department of Natural Resources. Accessed January 12, 2024. https://ohiodnr.gov/business-and-industry/best-management-practices/mining-reclamation-restoration/aml-reclamation-programs.
Ohio EPA. 1994. Disposal of Non-Toxic Bottom Ash, Fly Ash and Spent Foundry Sand, and Other Exempted Wastes. https://dam.assets.ohio.gov/image/upload/epa.ohio.gov/Portals/35/policy/04_28r.pdf.
P.-R. Wagner, J. Nagel, S. Marelli, and B. Sudret. 2022. "UQLab User Manual – Bayesian Inference for Model Calibration and Inverse Problems." UQLAB-V2.0-112. Switzerland: Chair of Risk, Safety and Uncertainty Quantification, ETH Zurich.
Pasini, Rachael A. 2009. "An Evaluation of Flue Gas Desulfurization Gypsum for Abandoned Mine Land Reclamation." The Ohio State University. https://etd.ohiolink.edu/acprod/odb_etd/etd/r/1501/10?clear=10&p10_accession_num=osu1250605536.
Petrović, Marija, and Željka Fiket. 2022. "Environmental Damage Caused by Coal Combustion Residue Disposal: A Critical Review of Risk Assessment Methodologies." Chemosphere 299 (July): 134410. https://doi.org/10.1016/j.chemosphere.2022.134410.
Robert Reid. 2007. "Boron Toxicity and Tolerance in Crop Plants." In Crop Improvement Under Adverse Conditions, 1st ed., 333–46.
Rudisell, M. T., B. J. Stuart, G. Novak, H. Payne, and C. S. Togni. 2001. "Use of Flue Gas Desulfurization By-Product for Mine Sealing and Abatement of Acid Mine Drainage." Fuel 80 (6): 837–43. https://doi.org/10.1016/S0016-2361(00)00157-5.
Ruhl, Laura, Avner Vengosh, Gary Dwyer, Heileen Hsu-Kim, and Amrika Deonarine. 2010. "Environmental Impacts of the Coal Ash Spill in Kingston, Tennessee: An 18-Month Survey | Environmental Science & Technology," November. https://pubs.acs.org/doi/full/10.1021/es1026739.
Scipy.Stats.CensoredData — SciPy v1.13.0.Dev Manual." n.d. Accessed March 15, 2024. https://scipy.github.io/devdocs/reference/generated/scipy.stats.CensoredData.html.
Soucek, David J., Amy Dickinson, and Brian T. Koch. 2011. "Acute and Chronic Toxicity of Boron to a Variety of Freshwater Organisms." Environmental Toxicology and Chemistry 30 (8): 1906–14. https://doi.org/10.1002/etc.578.
Sparling, D. W., T. P. Lowe, and P. G. C. Campbell. 1997. "Ecotoxicology of Aluminum to Fish and Wildlife," 47–68.
Stehouwer, R. et. al., 1996, *Land application uses for dry FGD by-products Phase II Report*. OCDO-96010697. The Ohio State University. Columbus, OH.
Taerakul, P, M Lamminen, H W Walker, and E Whitlatch. 2001. "Water Quality at the Roberts-Dawson Coal Mine Three Years After Placement of Flue Gas Desulfurization By-Product."
USEPA 2015a. "Engineering and Environmental Guidance on the Beneficial Use of Coal Combustion Products in Engineered Structural Fill Projects." https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://downloads.regulations.gov/EPA-HQ-RCRA-2009-0640-11969/content.pdf&ved=2ahUKEwiDgevmsceFAxVsk4kEHfAHDtkQFnoECBkQAQ&usg=AOvVaw11yc3jY0aJuhtx0ginyDxL.
USEPA 2015b. "Great Lakes Initiative (GLI) Clearinghouse." Collections and Lists. Great Lakes. April 24, 2015. https://www.epa.gov/gliclearinghouse.

USEPA 2015c. “National Recommended Water Quality Criteria - Aquatic Life Criteria Table.” Data and Tools. September 3, 2015. https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table.
USEPA 2019. “Leaching Environmental Assessment Framework (LEAF) Methods and Guidance.” Other Policies and Guidance. April 24, 2019. https://www.epa.gov/hw-sw846/leaching-environmental-assessment-framework-leaf-methods-and-guidance.
USEPA 2023. “Beneficial Use Evaluation of FGD Gypsum in Agriculture.” https://www.epa.gov/coalash/beneficial-use-evaluation-flue-gas-desulfurization-fgd-gypsum-agriculture.
USEPA 2024. “IRIS Assessments.” Reports & Assessments. 2024. https://iris.epa.gov/AtoZ/?list_type=alpha.
USEPA Online Dataset, List of Publicly Accessible Internet Sites Hosting Compliance Data and Information Required by the Disposal of Coal Combustion Residuals Rule. EPA. https://www.epa.gov/coalash/list-publicly-accessible-internet-sites-hosting-compliance-data-and-information-required. Accessed January 31, 2023.
USEPA, 2014a. “Coal Ash Reuse.” Other Policies and Guidance. December 11, 2014. https://www.epa.gov/coalash/coal-ash-reuse.
USEPA, 2015. “Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities.” https://www.federalregister.gov/documents/2015/04/17/2015-00257/hazardous-and-solid-waste-management-system-disposal-of-coal-combustion-residuals-from-electric.
USEPA, Coal Combustion Residuals Impoundment Assessment Reports. EPA. https://www3.epa.gov/epawaste/coal/html/index-4.html. Accessed January 31, 2023.
USEPA, OW. 2015. “National Primary Drinking Water Regulations.” Overviews and Factsheets. November 30, 2015. https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations.
USEPA, REG 05. 2015. “Great Lakes Initiative (GLI) Clearinghouse.” Collections and Lists. Great Lakes. April 24, 2015. https://www.epa.gov/gliclearinghouse.
USEPA,. 2014b. “Disposal of Coal Combustion Residuals from Electric Utilities Rulemakings.” Other Policies and Guidance. December 11, 2014. https://www.epa.gov/coalash/coal-ash-rule.
USEPA. (2014). *Human and Ecological Risk Assessment of Coal Combustion Residuals*. Office of Solid Waste and Emergency Response, Office of Resource Conservation and Recovery. https://downloads.regulations.gov/EPA-HQ-OLEM-2019-0173-0008/content.pdf
USEPA. (2022). National recommended water quality criteria—Aquatic life criteria table.
USEPA. 2011. “Exposure Factors Handbook 2011 Edition (Final Report).” Reports & Assessments. 2011. https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252.
Wang, Jiao, Guijian Liu, Yuan Liu, Chuncai Zhou, Yaqin Wu, and Qing Zhang. 2016. “Mobilization of Substance around Stackable Fly Ash and the Environmental Characteristics of Groundwater: With Particular Reference to Five Elements: B, Ba, Pb, Sb and Zn.” Fuel 174 (June): 126–32. https://doi.org/10.1016/j.fuel.2016.01.092.
Wang, Xinyue, Hans A. van der Sloot, Kevin G. Brown, Andrew C. Garrabrants, Zhiliang Chen, Bruce Hensel, and David S. Kosson. 2022. “Application and Uncertainty of a Geochemical Speciation Model for Predicting Oxyanion Leaching from Coal Fly Ash under Different Controlling Mechanisms.” Journal of Hazardous Materials 438 (September): 129518. https://doi.org/10.1016/j.jhazmat.2022.129518.
Weinberg, Rachel, Rachel Coyte, Zhen Wang, Debabrata Das, and Avner Vengosh. 2022. “Water Quality Implications of the Neutralization of Acid Mine Drainage with Coal Fly Ash from India and the United States.” Fuel 330 (December): 125675. https://doi.org/10.1016/j.fuel.2022.125675.
Wolfe, W. et al. , 2009, *FGD By-product Utilization at Ohio Coal Mine Sites: Past, Present, & Future*, CDO/D-07-06, Final Report, Columbus, OH.

Xu, Tianfu. 2008. “TOUGHREACT V4.13-OMP.” TOUGH. 2008. https://tough.lbl.gov/software/toughreact_v4-13-omp/.
Yu, Lu, Chunxue Wu, and Neal N. Xiong. 2022. “An Intelligent Data Analysis System Combining ARIMA and LSTM for Persistent Organic Pollutants Concentration Prediction.” Electronics 11 (4): 652. https://doi.org/10.3390/electronics11040652.
Zhang, Qian, Tracy Branam, and Greg Olyphant. 2017. “Development and Testing of a Model for Simulating Weathering and Trace Elements Release from Fixated Scrubber Sludge Utilized in Abandoned Coal Mine Reclamation Site.” International Journal of Coal Geology 169 (January): 92–105. https://doi.org/10.1016/j.coal.2016.11.017.
Zielinski, R. A., Otton, J. K., & Johnson, C. A. (2001). Sources of salinity near a coal mine spoil pile, north-central Colorado. *Journal of Environmental Quality*, 30, 1237–1248.
Zinnert, Hannah M., Matthew F. Gladfelter, H. Peyton Poe, Kate L. Merrill, Ashley V. Hennessey, Michael B. McDonald, Dengjun Wang, H. Allen Torbert, and Alan E. Wilson. 2023. “Positive and Negative Impacts of Flue Gas Desulfurization (FGD) Gypsum on Water Quality.” Journal of Environmental Management 348 (December): 119307. https://doi.org/10.1016/j.jenvman.2023.119307.

Appendix A: Risk Analysis Supplemental Data

Table C-1. Correlation matrix of uncertain parameters calibrated with Bayesian Inversion (BI)

	k_{As}	k_{Se}	A_{As}	A_{Se}
k_{As}	1	-0.16	-0.64	0.26
k_{Se}	-0.16	1	0.13	-0.11
A_{As}	-0.64	0.13	1	-0.35
A_{Se}	0.26	-0.11	-0.35	1

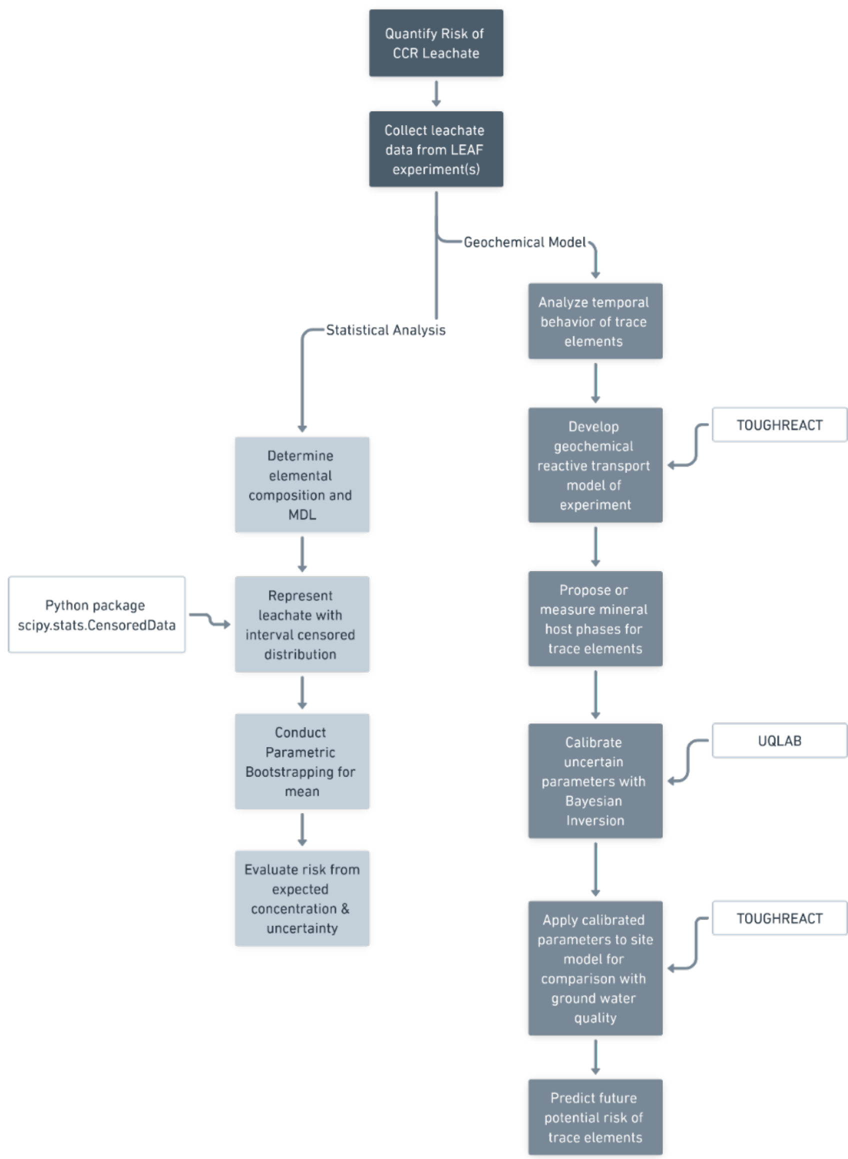

Figure C-1: Flow chart of risk analysis method

Appendix B: Geotechnical Test Results

TABLE 9-1
FIXATED FGD GETOTECHNICAL TESTING SUMMARY - March 2023 SAMPLING EVENT
CONVESVILLE FIVE POINTS ABANDONED MINE LANDS PHASE III AREAS
CONFSVILLE INDUSTRIAL PARK, LLC
CEC Project 196-318.0300

Composite Sample No.	Composite Source		Date	Standard Proctor (ASTM D 698)(2)		Sieve Analysis (ASTM D6913/D7928)				Permeability(2) (ASTM D5084)	Unconfined Compression Test(2) (ASTM D2166)	UU Triaxial Test(2) (ASTM D2850)		CU Triaxial Test (Total)(2) (ASTM D4767)		CU Triaxial Test (Effective)(2) (ASTM D4767)	
	Boring	Depth		Max. Dry Density (pcf)	Optimum Water Content (%)	% Gravel	% Sand	% Silt	%Clay (0.002mm)	k (cm/s)	Unconfined Strength (psf)	c (psf)	φ (deg)	c (psf)	φ (deg)	c' (psf)	φ' (deg)
1	SB-2	60-75	6/2/20 - 6/15/20	63.9	56.0	0.5	17.3	56.7	25.5	2.6E-06	806.4	1425.6	3.1	86.4	19.6	172.8	37.2
	SB-4	60-75															
	SB-7	60-75															
	SB-8	60-75															
2	SB-3	45-60	6/2/20 - 6/15/20	64.7	54.5	0.2	17.4	56.0	26.4	3.1E-06	1166.4	1843.2	10.6	403.2	19.7	72.0	37.2
	SB-6	0-15															
	SB-8	45-60															
	SB-9	30-45															
3	SB-1	0-15	6/2/20 - 6/15/20	64.5	54.9	0.5	21.1	47.4	31.0	4.4E-06	979.2	1958.4	6.7	-561.6	22.3	57.6	37.4
	SB-1	15-30															
	SB-1	30-45															
	SB-1	60-75															
4	SB-5	0-15	6/2/20 - 6/15/20	68.8	49.6	0.7	23.7	52.8	22.8	6.2E-06	1267.2	748.8	17.4	-345.6	20.5	187.2	38.0
	SB-5	30-45															
	SB-5	60-75															
	SB-5	75-90															
5	SB-9	0-15	6/2/20 - 6/15/20	69.1	49.5	0.1	22.5	See Note 1	See Note 1	1.0E-05	1036.8	1425.6	4.9	0.0	16.4	187.2	34.7
	SB-9	15-30															
	SB-9	45-60															
	SB-9	60-75															
	SB-6	45-60															
6	SB-7	0-15	6/2/20 - 6/15/20	63.7	56.3	0.1	17.2	See Note 1	See Note 1	1.7E-05	1123.2	1080.0	5.4	-345.6	24.1	374.4	36.3
	SB-7	30-45															
	SB-7	45-60															
	SB-7	75-90															
7	SB-3	15-30	6/2/20 - 6/15/20	68.0	51.7	0.5	25.2	See Note 1	See Note 1	9.1E-05	835.2	1440.0	7.5	-288.0	20.0	57.6	38.7
	SB-3	30-45															
	SB-3	60-75															
	SB-5	45-60															
8	CTPF102	5	7/16/2021	67.0	47.2	7.0	29.3	See Note 1	See Note 1	4.0E-05	1670.0	11.4	18.5	-0.9	19.0	1.0	35.8
	CTPF102	10															
9	CTPF102	15	7/16/2021	54.1	68.7	40.3	39.8	See Note 1	See Note 1	6.4E-04	604.8	9.3	24.7	4.8	26.5	2.7	37.6
	CTPF102	20															
10	CTPF103	5	9/28/2021	63.6	51.6	2.5	27.6	52.6	17.3	1.0E-04	21.9	14.9	23.5	4.5	16.5	2.9	33.5
	CTPF103	10															
11	CTPF103	15	9/28/2021	53.0	69.0	4.0	18.4	67.2	10.4	1.6E-04	6.5	4.0	23.4	2.3	15.5	1.2	39.1
	CTPF103	20															
12	CTPF104	5	11/1/2021	88.3	21.8	0.0	7.7	78.9	13.4	5.0E-05	5.0	2.7	25.3	0.6	15.9	1.4	22.4
	CTPF104	10															
13	CTPF104	15	11/1/2021	88.5	23.3	0.0	2.8	80.2	17	3.6E-05	6.6	3.2	25.1	6.0	15.1	2.7	27.0
	CTPF104	20															
14	CTPF105	25	1/21/2022	56.1	66.7	0.1	16.4	64.3	19.1	1.70E-05	14.2	11.8	23.5	4.9	16	0.8	38.6
	CTPF105	30															
15	CTPF106	5	3/21/2022	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
	CTPF106	10	3/21/2022	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
16	CTPF106	15	3/21/2022	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
	CTPF106	20	3/21/2022	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
17	CTPF107	5	5/25/2022	51.70	74.50	41.7	21.74	29.41	7.18	1.80E-05	See Note 3	16.60	0.0	0.0	15.63	0.0	15.63
	CTPF107	10	5/25/2022														
18	CTPF107	15	5/25/2022	56.10	67.40	49.4	35.49	14.53	0.54	8.60E-05	See Note 3	5.49	0.0	0.0	9.51	0.0	31.39
	CTPF107	20	5/25/2022														
19	CTPF108	5	7/27/2022	72.90	50.50	31.02	38.00	26.11	4.87	5.10E-05	See Note 3	18.14	0.00	1.91	13.95	0.00	38.03
	CTPF108	10	7/27/2022														
20	CTPF108	10	7/27/2022	53.50	69.70	17.31	38.43	34.24	4.31	1.90E-04	See Note 3	21.20	0.00	0.00	15.78	0.00	36.80
	CTPF108	15	7/27/2022														
21	CTPF109	5	7/27/2022	53.10	70.10	28.12	22.44	42.47	6.98	1.10E-05	See Note 3	19.12	0.00	0.27	17.55	0.00	37.52
	CTPF109	10	7/27/2022														
22	CTPF109	10	7/27/2022	49.70	79.30	47.80	25.20	24.72	2.28	8.40E-04	See Note 3	18.70	0.00	0.61	14.14	0.00	38.69
	CTPF109	15	7/27/2022														
23	CTPF210	5	11/17/2022	59.20	61.00	52.42	30.23	14.66	2.70	7.90E-06	See Note 3	5.24	0.00	0.07	15.27	0.00	36.79
	CTPF210	10															
24	CTPF220	5	1/25/2023	57.40	65.90	62.34	24.99	10.64	2.04	2.10E-04	See Note 3	19.88	0.00	0.50	15.13	0.00	40.63
25	CTPF230	5	3/3/2023	50.40	79.30	51.93	26.88	18.42	2.77	1.10E-04	See Note 3	23.61	0.00	2.68	11.84	0.00	41.33
			Maximum	88.5	79.3	62.3	39.8	80.2	31.0	8.40E-04	1670.0	1958.4	25.3	403.2	26.5	374.4	41.3
			Minimum	49.7	21.8	0.0	2.8	10.6	0.5	2.60E-06	5.0	2.7	0.0	-561.6	9.5	0.0	15.6
			Range	38.8	57.5	62.3	37.0	69.6	30.5	8.37E-04	1665.0	1955.7	25.3	964.8	17.0	374.4	25.7
			Average	62.5	58.2	19.1	23.9	42.9	12.0	1.17E-04	681.7	440.3	9.5	-44.5	17.2	48.8	35.2

Notes:
(1) Hydrometer results were not reported due to flocculation.
(2) Test specimens remolded to 90% of the standard proctor maximum density with a moisture content of +1.5% optimum moisture content.
(3) UC Compression results available in report. Multiple confining pressures used
(*) Geotechnical Testing not completed due to closure of the Geotechnical Testing Services, Inc. laboratory during analysis of

AEP CCP Testing Summary - Production FGD

Date	Standard Proctor (ASTM D 698)		Sieve Analysis (ASTM D422)				Permeability	Unconfined Compression Test	UU Triaxial Test		CU Triaxial Test (Total)		CU Triaxial Test (Effective)	
	Max. Dry Density (pcf)	Optimum Water Content (%)	% Gravel	% Sand	% Silt	%Clay (0.002 mm)	k, (cm/s)	Unconfined Strength (psf)	c (psf)	ϕ deg	c (psf)	ϕ, deg	c' (psf)	ϕ' deg
2/12/2012	77.2	33.1	NA	NA	68.7	10.4	4.08E-06	1,230	1,000	23	240	16.7	0	30.6
4/17/2012	61.4	56.6	NA	NA	58.6	9.8	6.30E-06	1,180	810	20.3	310	15.5	100	30.7
6/28/2012	70.5	43.1	NA	NA	67.2	7.3	5.48E-06	960	360	19	240	19.9	100	33.4
9/28/2012	63.8	50.4	NA	NA	38.2	8.7	3.46E-05	1,610	1,000	25.7	600	17.8	270	32.5
2/8-14/2013	74.1	38.7	NA	NA	77.7	7.3	5.00E-05	2,280	1,310	21.7	1,180	12.7	0	34.2
5/16/2013	62.2	52.5	NA	NA	71.3	14.9	1.12E-05	2,020	1,290	25.4	730	17.1	0	36.4
8/27/2013	70.2	42.0	NA	NA	76.2	11.9	1.28E-05	2,070	1,060	22.5	300	16.2	0	33.6
12/19/2013	67.6	44.3	NA	NA	80.0	9.6	1.48E-05	2,300	940	23.1	300	15.0	120	30.5
3/24/2014	67.2	46.4	NA	NA	69.3	6.8	2.58E-05	2,500	1,433	29.8	580	23.3	440	37.3
6/9/2014	65.8	48.4	NA	NA	68.2	6.5	3.08E-05	4,155	1,131	22.6	250	17.0	1,400	27.0
7/28/2014	72.8	41.7	NA	NA	63.1	5.7	1.38E-05	4,055	1,826	32.2	720	26.5	1,064	31.5
10/15/2014	64.4	48.6	NA	NA	76.4	7.5	2.08E-05	2,707	1,614	21.4	752	17.3	442	31.5
3/11/2015	68.2	43.3	NA	NA	81.9	8.7	2.44E-05	2,110	2,000	18.4	1,350	17.6	530	33.9
9/24/2015	70.3	41.3	NA	NA	67.5	8.8	1.07E-05	6,470	2,050	25.3	1,310	17.6	710	32.3
11/25/2015	69.6	42.4	NA	NA	76.9	9.7	3.36E-05	3,880	1,830	20.4	920	13.6	50	29.9
8/30/2016	73.7	33.9	NA	NA	78.2	9.1	2.77E-06	4,570	1,440	29.1	980	16.7	280	35.1
4/18/2017	69.7	39.7	NA	NA	86.8	9.1	4.20E-05	2,538	1,344	23.3	1,794	6.3	620	26.1
Maximum	77.2	56.6	NA	NA	86.8	14.9	5.0E-05	6470.0	2050.0	32.2	1794.0	26.5	1400.0	37.3
Minimum	61.4	33.1	NA	NA	38.2	5.7	2.8E-06	960.0	360.0	18.4	240.0	6.3	0.0	26.1
Range	15.8	23.5	NA	NA	48.6	9.2	4.7E-05	5510.0	1690.0	13.8	1554.0	20.2	1400.0	11.2
Average	68.7	43.9	NA	NA	71.0	8.9	2.0E-05	2743.2	1319.9	23.7	738.6	16.9	360.4	32.1

AEP CCP Testing Summary - Production Gypsum

Date	Standard Proctor (ASTM D 698)		Sieve Analysis (ASTM D422)				Permeability	Unconfined Compression Test	UU Triaxial Test		CU Triaxial Test (Total)		U Triaxial Test (Effectiv	
	Max. Dry Density (pcf)	Optimum Water Content (%)	% Gravel	% Sand	% Silt	%Clay (0.002mm)	k, (cm/s)	Unconfined Strength (psf)	c (psf)	ϕ deg	c (psf)	ϕ, deg	c' (psf)	ϕ' deg
3/15/2012	76.4	38.1	NA	NA	88.1	9.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4/17/2012	73.7	43.9	NA	NA	81.4	8.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6/28/2012	74.7	41.6	NA	NA	78.8	8.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9/28/2012	76.4	38.8	NA	NA	76.9	8.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2/8-14/2013	78.7	37.8	NA	NA	76.8	8.1	7.43E-04	470	460	31.6	1,260	49.1	0	39.4
5/16/2013	78.6	37.0	NA	NA	79.8	9.1	6.85E-04	700	380	36.1	2,440	36.5	0	39.0
8/27/2013	83.4	27.6	NA	NA	73.1	6.3	4.95E-04	600	40	35.4	1,470	41.9	0	40.4
11/19/2013	79.4	35.1	NA	NA	83.0	8.6	4.83E-04	460	50	35.5	1,970	39.6	0	40.3
3/24/2014	85.9	22.7	NA	NA	71.4	9.5	2.04E-04	691	405	43.4	1,278	33.6	534	40.9
6/9/2014	83.4	27.5	NA	NA	88.3	6.4	3.08E-04	1,510	656	40.1	1,238	36.0	462	39.9
7/28/2014	79.4	33.9	NA	NA	71.8	7.5	4.93E-04	703	736	34.7	1,468	31.8	241	38.3
11/12/2014	83.8	24.8	NA	NA	83.9	8.5	3.16E-04	1,842	862	26.9	1693	31.0	1,285	33.2
3/11/2015	80.3	31.0	NA	NA	84.2	9.0	4.93E-04	1,080	890	38.2	2,060	19.9	700	37.0
9/24/2015	85.1	26.1	NA	NA	88.8	9.0	6.54E-05	2,950	970	41.5	2,640	18.4	0	42.3
11/25/2015	76.1	39.0	NA	NA	87.8	8.0	3.43E-04	350	370	30.2	470	30.4	0	35.2
8/30/2016	88.8	17.0	NA	NA	82.2	7.6	2.98E-04	490	180	35.7	440	24.4	380	30.7
4/18/2017	90.3	17.8	NA	NA	75.2	9.6	3.30E-04	827	548	32.4	1046	32.4	0	39.8
4/2/2018	91.3	17.3	NA	NA	68.4	6.8	2.20E-04	626	513	32.4	930	16.9	0	29.0
4/19/2019	89.7	18.3	NA	NA	85.6	8.6	2.10E-04	455	67	35.2	1520	26.1	254	34.5
Maximum	91.3	43.9	NA	NA	88.8	9.6	7.4E-04	2950.0	970.0	43.4	2640.0	49.1	1285.0	42.3
Minimum	73.7	17.0	NA	NA	68.4	6.3	6.5E-05	350.0	40.0	26.9	440.0	16.9	0.0	29.0
Range	17.6	26.9	NA	NA	20.4	3.3	6.8E-04	2600.0	930.0	16.5	2200.0	32.2	1285.0	13.3
Average	81.9	30.3	NA	NA	80.3	8.2	3.8E-04	916.9	475.1	35.3	1461.5	31.2	257.1	37.3

AEP CCP Testing Summary - Limestone FGD

Date	Standard Proctor (ASTM D 698)		Sieve Analysis (ASTM D422)				Permeability	Unconfined Compression Test	UU Triaxial Test		CU Triaxial Test (Total)		CU Triaxial Test (Effective)	
	Max. Dry Density (pcf)	Optimum Water Content (%)	% Gravel	% Sand	% Silt	%Clay (0.002 mm)	k, (cm/s)	Unconfined Strength (psf)	c (psf)	ϕ deg	c (psf)	ϕ, deg	c' (psf)	ϕ' deg
9/8/2016	82.2	29.9	NA	NA	76.1	13.4	4.73E-06	4,580	1,730	21.7	1,210	11.6	310	30.9
4/2/2018	82.9	26.1	NA	NA	78.0	7.2	4.20E-05	4,235	2,420	27.2	1,957	18.1	849	36
11/21/2019	75.3	35.2	NA	NA	61.9	5.6	5.10E-05	1,880	1,394	24.8	1,116	12.3	501	28.5
Maximum	82.9	35.2	NA	NA	78.0	13.4	5.1E-05	4580.0	2420.0	27.2	1957.0	18.1	849.0	36.0
Minimum	75.3	26.1	NA	NA	61.9	5.6	4.7E-06	1880.0	1394.0	21.7	1116.0	11.6	310.0	28.5
Range	7.6	9.1	NA	NA	16.1	7.8	4.6E-05	2700.0	1026.0	5.5	841.0	6.5	539.0	7.5
Average	80.1	30.4	NA	NA	72.0	8.7	3.3E-05	3565.0	1848.0	24.6	1427.7	14.0	553.3	31.8

NA - Not Available

TABLE 9-2
Ponded Fly Ash GETOTECHNICAL TESTING SUMMARY - March 2023 SAMPLING EVENT
CONVESVILLE FIVE POINTS ABANDONED MINE LANDS PHASE III AREAS
CONFSVILLE INDUSTRIAL PARK, LLC
CEC Project 196-318.0300

Date	Test Pit No.	Standard Proctor (ASTM D 698)		Sieve Analysis (ASTM D422)		Permeability	Unconfined Compression Test	UU Triaxial Test		CU Triaxial Test (Total)		CU Triaxial Test (Effective)		Direct Shear Test (Total)		One-Point Compaction Test	
		Max. Dry Density (psi)	Optimum Water Content (%)	% Silt	%Clay (0.002mm)	k, (cm/s)	Unconfined Strength (psf)	c (psi)	φ deg	c (psi)	φ, deg	c' (psi)	φ' deg	c (psf)	φ, deg	Dry Density (pcf)	Water Content (%)
7/15/2021	CTP100-5'/10'	99.2	18.9	71.2	5.9	2.70E-05	1498	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7/15/2021	CTP100-15'/20'	95.5	22.7	46.1	3.4	4.60E-05	432	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7/15/2021	CTP101-5'/10'	97.5	20.4	75.8	3.8	1.06E-05	1109	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7/15/2021	CTP101-15'/20'	96.7	19.8	64.2	4.1	2.20E-05	1094	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1/21/2022	CTP110-5'/10'	87.9	22.7	77.8	12.7	4.60E-05	878	5.2	25.3	2.3	11.3	0.7	31.6	N/A	N/A	N/A	N/A
1/21/2022	CTP110-15'/20'	87.5	25.3	77.3	14.7	1.70E-05	374	2.2	16.6	1.8	14.7	1.0	28.6	N/A	N/A	N/A	N/A
3/21/2022	CTP120-5'/10'	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
3/21/2022	CTP120-15'/20'	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*
5/25/2022	CTP130-5'/10'	106.7	17.1	57.57	4.75	4.30E-05	See Note 1	13.21	0.00	0.00	6.72	0.00	23.89	N/A	N/A	N/A	N/A
5/25/2022	CTP130-15'/20'	113.3	13.8	11.13	2.25	5.80E-06	See Note 1	1.35	0.00	0.00	13.79	0.00	36.63	N/A	N/A	N/A	N/A
7/27/2022	CTP140-5'/10'	105.6	12.2	6.79	1.08	1.60E-04	See Note 1	14.78	0.00	-0.12	11.88	0.00	40.98	N/A	N/A	N/A	N/A
7/27/2022	CTP140-10'/15'	116.4	12.5	3.90	0.15	9.20E-04	See Note 1	1.85	0.00	7.30	18.50	0.00	38.24	N/A	N/A	N/A	N/A
7/27/2022	CTP150-5'/10'	87.9	23.1	78.59	2.03	2.50E-05	See Note 1	13.79	0.00	See Note 2	See Note 2	See Note 2	See Note 2	N/A	N/A	N/A	N/A
7/27/2022	CTP150-10'/15'	90.5	19.9	72.21	2.30	1.70E-05	See Note 1	13.38	0.00	See Note 2	See Note 2	See Note 2	See Note 2	N/A	N/A	N/A	N/A
11/17/2022	CTP170-5'/10'	53.5	62.3	59.89	6.78	4.80E-05	See Note 1	6.25	0.00	See Note 2	See Note 2	See Note 2	See Note 2	N/A	N/A	N/A	N/A
1/27/2023	CTP180-5'10	98.2	18.8	78.93	1.34	6.30E-05	See Note 1	10.41	0.00	See Note 2	See Note 2	See Note 2	See Note 2	N/A	N/A	N/A	N/A
3/3/2023	CTP190-5'10'	94.1	20.6	49.79	2.20	8.40E-05	See Note 1	19.85	0.00	See Note 2	See Note 2	See Note 2	See Note 2	N/A	N/A	N/A	N/A
	Maximum	116.4	62.3	78.9	14.7	9.20E-04	1497.6	19.9	25.3	7.3	18.5	1.0	41.0	N/A	N/A	N/A	N/A
	Minimum	53.5	12.2	3.9	0.2	5.80E-06	374.4	1.4	0.0	-0.1	6.7	0.0	23.9	N/A	N/A	N/A	N/A
	Range	62.9	50.1	75.0	14.6	9.14E-04	1123.2	18.5	25.3	7.4	11.8	1.0	17.1	N/A	N/A	N/A	N/A
	Average	95.4	22.0	55.4	4.5	1.02E-04	897.6	9.3	3.8	1.0	11.6	0.4	30.2	N/A	N/A	N/A	N/A

(*) Geotechnical Testing not completed due to closure of the Geotechnical Testing Services, Inc. labaratory during analysis of
(1) UC results available in report. Multiple confining pressures used
(2) CU tests incomplete due to samples dissolving when prepared

AEP CCP Testing Summary - Ponded Ash

Date	Test Pit No.	Standard Proctor (ASTM D 698)		Sieve Analysis (ASTM D422)		Permeability	Unconfined Compression Test	UU Triaxial Test		CU Triaxial Test (Total)		CU Triaxial Test (Effective)		Direct Shear Test (Total)		One-Point Compaction Test	
		Max. Dry Density (pcf)	Optimum Water Content (%)	% Silt	%Clay (0.002mm)	k, (cm/s)	Unconfined Strength (psf)	c (psf)	φ deg	c (psf)	φ, deg	c' (psf)	φ' deg	c (psf)	φ, deg	Dry Density (pcf)	Water Content (%)
3/11/2015	N/A	92.7	22.1	78.4	4.5	9.90E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	79.0	35.9
9/24/2015	N/A	98.0	18.2	88.0	6.3	3.12E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	94.8	19.6
8/30/2016	N/A	98.7	18.4	86.1	6.4	5.23E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	94.8	20.8
4/18/2017	N/A	109.7	16.2	86.1	3.1	4.0E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	103.3	13.1
4/2/2018	N/A	100.4	17.2	80.9	6.8	4.7E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	96.7	22.2
4/19/2019	N/A	99.8	17.8	85.3	3.8	7.7E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	96.1	14.9
2/23/2021	CFTP-24	71.3	38.0	62.3	12.9	1.30E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.0	35.3	N/A	N/A
2/23/2021	CFTP-26	99.4	19.7	83.8	15.1	2.30E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.0	30.1	N/A	N/A
2/23/2021	CFTP-27	100.5	17.6	N/A	N/A	2.60E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.6	27.9	N/A	N/A
	Maximum	109.7	22.1	88.0	6.8	4.00E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	103.3	35.9
	Minimum	92.7	16.2	78.4	3.1	3.12E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	79.0	13.1
	Range	17.0	5.9	9.6	3.7	3.69E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24.3	22.8
	Average	99.9	18.3	84.1	5.2	1.18E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	94.1	21.1

TABLE 9-2
COMPOSITED ASH/FGD GETOTECHNICAL TESTING SUMMARY - September 2022 SAMPLING
CONVESVILLE FIVE POINTS ABANDONED MINE LANDS PHASE III AREAS
CONFSVILLE INDUSTRIAL PARK, LLC
CEC Project 196-318.0300

Date	Test Pit No.	Standard Proctor (ASTM D 698)		Analysis (ASTM		Permeability	ned Compress	UU Triaxial Test		CU Triaxial Test (Total)		U Triaxial Test (Effectiv		Direct Shear Test (Tota		e-Point Compaction T	
		Max. Dry Density (psi)	Optimum Water Content (%)	% Silt	%Clay (0.002mm)	k, (cm/s)	Unconfined Strength (psf)	c (psi)	ϕ deg	c (psi)	ϕ, deg	c' (psi)	ϕ' deg	c (psf)	ϕ, deg	Dry Density (pcf)	Water Content (%)
9/14/2022	CTP160/CTPF200-BB-5'10'-091422	75	38	35.73	2.81	8.00E-05	See Report	37.49	0	-0.52	18.91	0	35.09	N/A	N/A	N/A	N/A
9/14/2022	CTP160/CTPF200-BB-10'20'-091422	72.3	40.1	36.55	1.94	1.20E-04	See Report	26.99	0	4.03	14.81	0	34.79	N/A	N/A	N/A	N/A
	Max	75	40.1	36.55	2.81	0.00012	N/A	37.49	0	4.03	18.91	0	35.09	N/A	N/A	N/A	N/A
	Min	72.3	38	35.73	1.94	0.00008	N/A	26.99	0	-0.52	14.81	0	34.79	N/A	N/A	N/A	N/A
	Range	2.7	2.1	0.82	0.87	0.00004	N/A	10.5	0	4.55	4.1	0	0.3	N/A	N/A	N/A	N/A
	Average	73.65	39.05	36.14	2.375	0.0001	N/A	32.24	0	1.755	16.86	0	34.94	N/A	N/A	N/A	N/A

NOTE: Results Dissassociated from respective Ash/FGD tables due to samples being composited by Geotechnics laboratory

TABLE 9-3
PONDED BOTTOM ASH GETOTECHNICAL TESTING SUMMARY - FEBRUARY 2021 SAMPLING EVENT
CONVESVILLE FIVE POINTS ABANDONED MINE LANDS PHASE III AREAS
CONFSVILLE INDUSTRIAL PARK, LLC
CEC Project 196-318.0300

Date	Test Pit No.	Standard Proctor (ASTM D 698)		Sieve Analysis (ASTM D422)		Permeability	Unconfined Compression Test	UU Triaxial Test		CU Triaxial Test (Total)		CU Triaxial Test (Effective)		Direct Shear Test (Total)		One-Point Compaction Test	
		Max. Dry Density (pcf)	Optimum Water Content (%)	% Silt	%Clay (0.002mm)	k, (cm/s)	Unconfined Strength (psf)	c (psf)	ϕ deg	c (psf)	ϕ, deg	c' (psf)	ϕ' deg	c (psf)	ϕ, deg	Dry Density (pcf)	Water Content (%)
2/23/2021	CFTP-25	102.1	16.0	81.1	11.6	3.20E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.4	28.7	N/A	N/A
2/23/2021	CFTP-29	96.2	22.2	N/A	N/A	1.10E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.6	29.1	N/A	N/A
	Maximum	102.1	22.2	81.1	11.6	1.10E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.6	29.1	N/A	N/A
	Minimum	96.2	16.0	81.1	11.6	3.20E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.4	28.7	N/A	N/A
	Range	5.9	6.2	0.0	0.0	7.80E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.2	0.4	N/A	N/A
	Average	99.2	19.1	81.1	11.6	7.10E-05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.0	28.9	N/A	N/A

AEP CCP Testing Summary - Bottom Ash

Date	Test Pit No.	Standard Proctor (ASTM D 698)		Sieve Analysis (ASTM D422)		Permeability	Unconfined Compression Test	UU Triaxial Test		CU Triaxial Test (Total)		CU Triaxial Test (Effective)		Direct Shear Test (Total)		One-Point Compaction Test	
		Max. Dry Density (pcf)	Optimum Water Content (%)	% Silt	%Clay (0.002mm)	k, (cm/s)	Unconfined Strength (psf)	c (psf)	ϕ deg	c (psf)	ϕ, deg	c' (psf)	ϕ' deg	c (psf)	ϕ, deg	Dry Density (pcf)	Water Content (%)
3/11/2015	N/A	100.9	17.0	20.8	2.8	6.23E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	90.1	29.0
9/24/2015	N/A	71.8	35.1	65.3	5.7	1.19E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	67.7	45.0
8/30/2016	N/A	87.8	25.2	13.6	1.5	4.13E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	86.0	9.4
4/18 & 5/22/17	N/A	78.4	31.9	34.9	3.5	6.40E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	71.2	27.5
4/2/2018	N/A	96.3	15.6	12.9	1.6	3.90E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	90.4	18.0
4/19/2019	N/A	84.5	24.5	13.2	1.1	6.6E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	83.1	20.4
	Maximum	100.9	35.1	65.3	5.7	6.60E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	90.4	45.0
	Minimum	71.8	15.6	12.9	1.1	1.19E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	67.7	9.4
	Range	29.1	19.5	52.4	4.6	5.41E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	22.7	35.6
	Average	86.6	24.9	26.8	2.7	4.74E-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	81.4	24.9

Appendix C: Site Water Quality Results

MW-1401

SAMPLING DATE	Field Measurements: Depth to SWL ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L
Sample Size	43	42	42	42	42	43	43	43	33	43	42	43	43	18	43	43
Average of detected	59.1	7.0	2787.9	-78.9	12.3	144.4	-33.7	2173.7	68.1	0.3	236.6	1257.1	0.12	13.3	387.1	103.8
Std.Dev. Of detected	1.4	0.3	610.0	48.1	1.3	38.9	58.8	208.2	42.0	0.1	160.6	91.1	0.11	0.8	49.5	11.8
Maximum of Detected	62.0	7.9	4490.0	134.6	16.4	215.0	31.0	2600.0	256.0	0.4	510.0	1445.0	0.20	15.0	510.0	130.0
Median of Detected	59.2	6.9	2554.0	-86.5	12.0	152.5	-33.7	2130.0	60.0	0.3	142.5	1250.0	0.12	13.2	377.0	102.7
Minimum of Detected	56.5	6.3	2045.0	-133.0	10.3	41.0	-152.0	1870.0	18.0	0.2	50.1	1090.0	0.05	11.4	321.0	83.1
DL							<2						<0.09			
3/26/2015	59.7	6.85	2102	-73	10.9	173	<2	1870		0.30	98.8	1305	<0.09		349	102.4
4/13/2015						165	<2	1880		0.25	90.5	1180	<0.09		347	99.7
4/27/2015	58.7	6.87	2138	-76	10.8	149	<2	2030		0.30	77.5	1305	<0.09		365	103.0
5/11/2015	59.1	6.84	2162	-70	12.2	137	<2	1960		0.32	64.5	1370	<0.09		351	98.7
5/26/2015	58.7	6.87	2204	-78	12.4	112	<2	2138		0.30	57.5	1390	<0.09		353	99.7
6/9/2015	58.9	6.85	2101	-76	11.9	130	<2	2090		0.26	53.1	1440	<0.09		349	96.9
6/23/2015	57.6	6.89	2206	-80	11.8	132	<2	2138		0.28	50.1	1445	<0.09		373	106.0
7/7/2015	57.8	6.89	2179	-90	11.5	124	<2	2170		0.29	52.6	1380	<0.09		373	106.0
7/21/2015	58.3	6.92	2129	-101	11.4	167	<2	2030		0.30	55.9	1290	<0.09		352	99.4
10/12/2015	62.0	7.04	2045	-94	11.5	159	<2	1940		0.30	68.6	1130	<0.09		345	96.7
3/6/2016	60.9	6.80	2467	-82	11.3	215	<2	2150	31.2	0.35	94.3	1180	<0.09		321	89.2
5/17/2016	59.9	6.87	2467	-64	11.0	203	<2	2080	256.0	0.26	105	1260	<0.09		333	96.3
8/23/2016	61.1	6.95	2441	-62	11.5	181	<0.4	2065	79.4	0.36	127	1230	<0.09		361	97.1
12/6/2016	61.8	6.92	2558	-78	11.1	197	<0.4	2180	65.9	0.36	92.8	1340	<0.09		377	102
2/21/2017	60.9	7.07	2561	-82	11.4	157	0.4	2130	70.0	0.33	104	1290	0.045		366	83.1
6/13/2017	59.9	7.00	2483	-129	11.7	153	2.5	2060	60.0	0.33	143	1200	0.20		324	86.2
9/12/2017	60.8	7.03	2425	-97	12.2	152.5	<0.1	1950	72.5	0.33	137	1145	<0.09		338	92.3
11/7/2017	60.6	7.04	2450	-90	11.3	162	< 5	2050	69.8	0.32	128	1210	< 0.09		334	89.9
2/7/2018	60.4	7.67	2442	-87	10.8	174	< 5	2040	85.9	0.33	124	1220	< 0.09		353	88.7
5/2/2018	57.6	6.98	2360	-94	11.7	168	< 5	1930	61.8	0.40	139	1160	< 0.002	13.2	343	92.2
7/11/2018	59.3	7.90	2370	-109	11.9	129	< 5	1900	44.0	0.38	142	1160	< 0.002	12.0	329	88.8
10/17/2018	59.2	7.11	2350	-99	12.0	149	< 8	1960	28.8	0.38	137.0	1090	< 0.002	11.4	328	89.2
2/13/2019	56.5	7.32	2610	-105	11.1	163	< 8	2100	57.2	0.36	178.0	1240	< 0.002	13.8	385	104.0
5/15/2019	57.8	7.69	2730	-116	12.0	176	< 8	2330	48.1	0.37	218.0	1280	< 0.002	13.1	403	101.0
8/21/2019	58.8	6.70	3060	-122	13.6	177	< 8	2600	45.6	0.35	304	1410	< 0.002	13.7	417	112
11/20/2019	59.7	6.30	3000	-129	11.4	186	< 8	2490	53.7	0.32	306	1220	< 0.002		428	110
2/19/2020	58.1	6.98	2550	-118	12.0	201	< 8	2360	36.4	0.36		1230	< 0.002		406	105
4/29/2020	57.3	7.65	2420	-132	12.0	192	< 8	2390	43.2	0.32	341	1200	< 0.002		393	105
CIP took over sampling																
9/22/2020	59.8	7.09	4132	135	12.70	103	24.6	2160	46	0.356	369	1240	<0.2		452	122
11/23/2020	60.3	6.58	3210	-86	12.23	82	13	2200	92	0.32	400	1300	<0.2		410	110
1/14/2021	60.2	6.95	3180	-42	11.70	92	`-35.2	2300	89	0.38	410	1300	<0.13		400	110
4/5/2021	59.31	6.81	2960	-74	13.01	110	-43.3	2100	82	0.39	390	1200	<0.13	14	390	110
8/13/2021	59.70	7.69	2960	70	14.17	120	-33.7	2500	71	0.44	440	1300	<0.13	13	410	110
11/12/2021	59.95	7.37	3130	-87	16.43	72	-46.7	2400	100	0.28	450	1300	<0.13	14	460	130
3/11/2022	56.6	6.69	3730	-50	13.47	41	31	2600	53	0.21	460	1300	<0.13	14	510	130
4/4/2022	57.0	6.78	3730	-56	12.08	120	-36	2500	60	0.34	460	1300	<0.13	14	500	120
7/18/2022	57.7	7.32	3370	-38	14.01	140	11	2000	59	0.37	430	1200	<0.13	13	410	110
10/11/2022	58.53	7.20	4490	-44	13.39	82	16	2500	150	0.19	490	1400	<0.13	14	480	120
3/21/2023	58.9	6.68	3230	-108	14.06	96	-45.2	2100	66	0.25	390	1100	<0.13	13	410	100
4/13/2023	58.15	6.67	3270	-97	13.95	170	-152	2200	49	0.25	420	1200	<0.13	13	390	99
8/21/2023	59.00	6.47	3280	-97	14.54	130	-147	2100	18	0.27	440	1300	<0.13	13	420	110
11/28/2023	59.88	6.85	3730	-73	10.32	160	<5.0	2200	75	0.24	390	1100	<0.13	13	420	110
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																
5/20/2024	57.70	7.13	3680	-133	14.79	110	-100	2600	28	0.26	510	1300	<0.13	15	490	130

SAMPLING DATE	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	Si mg/L	SiO2	Sr mg/L	Tl mg/L
Sample Size	43	43	43	43	43	16	44	43	43	43	43	43	43	43	43	43	12	43	20	20
Average of detected	0.0186	0.394	0.00015	64.1	3.96	0.00000	81.8	0.043	0.00074	0.0241	0.000061	0.00008	0.0001	0.00035	0.00123	0.0001	7.6	12.8	7.03	0.00021
Std.Dev. Of detected	0.0348	0.069	0.00010	14.1	0.62	NA	30.3	0.123	0.00072	0.0504	0.000140	0.00014	0.0001	0.00026	0.00314	0.0001	0.3	3.0	0.77	0.00018
Maximum of Detected	0.1600	0.540	0.00033	94.0	5.30	0.00000	140.0	0.392	0.00428	0.3470	0.000620	0.00042	0.0002	0.00142	0.01172	0.0004	8.1	17.0	8.30	0.00040
Median of Detected	0.0064	0.384	0.00010	63.7	4.10	0.00000	78.7	0.002	0.00056	0.0165	0.000020	0.00003	0.0001	0.00026	0.00005	0.0001	7.5	12.4	7.15	0.00020
Minimum of Detected	0.0010	0.263	0.00002	37.3	2.70	0.00000	37.8	0.000	0.00024	0.0143	0.000011	0.00000	0.0000	0.00014	0.00001	0.0001	7.1	2.9	6.00	0.00004
DL													<0.0001			<0.0005				
3/26/2015	0.0037	0.311	0.00010	57.3	4.10		39.1	0.002	0.00077	0.0158	0.000017	<0.00005	<0.0001	0.00068	0.00004	<0.0005		9.0		
4/13/2015	0.0085	0.310	0.00012	62.2	4.23		37.8	<0.001	0.00055	0.0165	<0.00001	<0.00005	<0.0001	0.00054	0.00005	<0.0005		13.9		
4/27/2015	0.0071	0.339	0.00018	64.6	4.34		43.3	<0.001	0.00061	0.0171	0.000015	<0.00005	<0.0001	0.00054	<0.00002	<0.0005		12.6		
5/11/2015	0.0013	0.320	0.00005	60.5	4.17		40.3	<0.001	0.00055	0.0163	<0.00001	<0.00005	<0.0001	0.00058	0.00575	<0.0005		14.9		
5/26/2015	0.0025	0.321	0.00007	67.6	4.20		41.7	<0.001	0.00049	0.0165	0.000015	<0.00005	<0.0001	0.00044	0.00004	<0.0005		11.4		
6/9/2015	0.0019	0.263	0.00006	70.2	4.08		39.9	<0.001	0.00048	0.0162	0.000011	<0.00005	<0.0001	0.00039	0.00003	<0.0005		11.2		
6/23/2015	0.0038	0.362	0.00031	75.0	4.34		46.7	0.001	0.00041	0.0160	0.000014	<0.00005	<0.0001	0.00026	0.01172	<0.0005		12.1		
7/7/2015	0.0024	0.357	0.00027	72.9	4.20		48.2	<0.001	0.00042	0.0166	0.000018	<0.00005	<0.0001	0.00033	0.00002	<0.0005		2.9		
7/21/2015	0.0114	0.320	0.00019	66.3	3.82		49.8	0.392	0.00428	0.3470	0.000347	0.00011	<0.0001	0.00041	0.00833	<0.0001		12.5		
10/12/2015	0.0079	0.390	0.00030	61.1	3.53		52.0	<0.002	0.00157	0.0171	0.000017	<0.00005	<0.0001	0.00026	0.00037	0.0001		9.7		
3/6/2016	0.0022	0.346	0.00007	51.8	3.08		55.8	<0.002	0.00094	0.0162	<0.00002	<0.00002	<0.00005	0.00025	0.00002	0.0001		9.25		
5/17/2016	0.0182	0.334	0.00008	48.6	3.21		65.8	<0.002	0.00089	0.0165	0.000020	<0.00002	0.00010	0.00024	0.00005	0.0001		10.1		
8/23/2016	0.0050	0.310	0.00023	63.7	3.55		64.6	0.0045	0.00079	0.0179	<0.00002	0.000060	0.00009	0.00025	0.00014	<0.0002		11.7		
12/6/2016	0.0033	0.372	0.00010	71.1	4.05		59.8	<0.002	0.00098	0.0157	0.000024	0.000010	0.00010	0.00031	0.00010	0.0002		11.6		
2/21/2017	0.0115	0.350	0.00033	59.1	3.63		59.6	0.0004	0.00082	0.0143	0.000020	0.000004	0.00004	0.00142	0.00008	0.0001		11.5		
6/13/2017	0.0010	0.442	0.00021	44.5	2.94		62.6	0.0004	0.00060	0.0151	0.000020	0.000005	0.00021	0.00033	0.00002	0.0001		12.4		
9/12/2017	0.0075	0.354	0.00006	46.2	3.07		71.4	.00008	0.00069	0.0155	0.000020	<0.0001	0.00011	0.00030	0.00004	0.0002		11.6		
11/7/2017	0.0189	0.356	0.00015	54.6	3.28		68	0.0008	0.00064	0.0147	0.000030	< 0.00001	0.00015	0.00020	0.00004	0.0001		10.6		
2/7/2018	< 0.002	0.415	0.00002	54.6	3.41		65	0.0008	0.00062	0.0160	0.000030	0.000020	0.00003	0.00026	0.00002	0.0001		10.9		
5/2/2018	0.00581	0.384	0.00010	45.2	3.20		74.0	0.0004	0.00043	0.0152	0.000024	< 0.000005	0.00008	0.00016	0.00004	0.0002		13.5	6.23	0.00004
7/11/2018	0.00212	0.442	0.00010	37.3	2.70		78.7	0.0005	0.00043	0.0150	0.000022	< 0.000005	0.00007	0.00017	0.00001	0.0001		12.9	6.13	< 0.00001
10/17/2018	0.0182	0.386	0.0002	43.4	2.90	< 0.0008	72.8	0.0020	0.00048	0.0153	< 0.00004	0.000040	0.00010	0.00021	0.00006	0.0001		12.1	6.00	< 0.0002
2/13/2019	< 0.001	0.472	0.00004	49.5	3.31	< 0.0004	85.3	0.0007	0.00039	0.0177	0.00003	< 0.00001	< 0.00004	0.00016	< 0.00002	0.0001		11.9	7.41	< 0.0001
5/15/2019	0.0020	0.356	0.00004	47.8	3.60	< 0.0004	86.3	0.0007	0.00024	0.0171	0.00003	< 0.00001	0.00007	0.00014	< 0.00002	0.0001		14.1	7.59	< 0.00001
8/21/2019	0.050	0.372	< 0.001	57.8	3.98	< 0.002	94.0	< 0.004	0.00050	0.0181	< 0.0001	< 0.00005	0.00020	< 0.0005	< 0.0002	0.0004		10.8	8.12	< 0.0005
11/20/2019	< 0.005	0.336	< 0.0002	66.0	4.17		84.5	0.0007	0.00046	0.0161	0.00003	< 0.00001	0.0002	0.0002	< 0.00005	0.0002		9.8		
2/19/2020	< 0.005	0.326	< 0.0002	69.4	4.06		91.2	0.0007	0.00053	0.0155	0.00002	< 0.00001	0.00010	0.0002	0.00008	0.0001		11		
4/29/2020	< 0.005	0.324	0.0003	52.6	3.53		97.5	0.0030	0.00056	0.0167	0.00002	< 0.00001	0.00006	0.0003	< 0.00005	0.0001		11.6		
CIP took over sampling																				
9/22/2020	<0.05	0.473	<0.002	82.4	5.07		102.0	0.0200	<0.005	0.0170	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005		8.3		
11/23/2020	<0.05	0.450	<0.002	76.0	4.40		100.0	<0.02	<0.005	0.0160	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005		16.0		
1/14/2021	<0.034	0.400	<0.0017	75	4.30		110.0	<0.015	<0.00075	0.0150	<0.00031	<0.00020	<0.00098	<0.0015	<0.00045	<0.00089		15		
4/5/2021	<0.047	0.500	<0.0035	54	3.70	<0.0049	100.0	<0.0097	<0.0041	0.0150	0.00062	0.000420	<0.00063	<0.0022	<0.0028	<0.006	7.90	17	6.2	0.0004
8/13/2021	0.0900	0.440	<0.0017	80	4.40	<0.0011	100.0	<0.015	<0.00075	0.0170	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	7.50	16	7.1	<0.00020
11/12/2021	<0.034	0.500	<0.0017	93	5.30	<0.0011	110.0	<0.015	<0.00075	0.0170	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	7.40	16	8.3	<0.00020
3/11/2022	0.160	0.470	<0.0011	88	4.90	<0.00061	120.0	<0.0029	0.00029	0.0180	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	8.1000	17	7.8	<0.00047
4/4/2022	<0.016	0.480	<0.0011	79	4.60	<0.00061	120.0	<0.0029	<0.00028	0.0180	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	7.5000	17	8.1	<0.00047
7/18/2022	<0.034	0.390	<0.0017	71	4.30	<0.0011	140	<0.015	<0.00075	0.0180	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	7.1000	15	7.3	<0.00020
10/11/2022	<0.034	0.470	<0.0017	94	5.00	<0.0011	120	<0.015	<0.00075	0.0170	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	7.5000	16	7.2	<0.00020
3/21/2023	<0.034	0.420	<0.0017	49	4.30	<0.0011	120	<0.015	<0.00075	0.0150	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	7.5000	16	6.5	<0.00020
4/13/2023	<0.034	0.530	<0.0017	63	4.20	<0.0011	110	<0.015	<0.00075	0.0160	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	7.7000	16	6.4	<0.00020
8/21/2023	<0.034	0.460	<0.0017	72	4.20	<0.0011	120	<0.015	<0.00075	0.0170	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	7.6000	16	6.4	<0.00020
11/28/2023	<0.034	0.450	<0.0017	72	4.50	<0.0011	130	<0.015	<0.00075	0.0180	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	7.9000	17	6.3	0.0002
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																				
5/20/2024	0.0380	0.540	<0.0017	89	4.60	<0.0011	140	<0.015	0.00079	0.0200	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	7.5000	16	7.5	<0.00020

Record of Duplicates

SAMPLING DATE	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg
3/26/2015	172	<2	1850		0.34	98.7	1150	<0.09		346	99.5
Duplicate	174	<2	1890		0.32	98.8	1140	<0.09		351	101
4/27/2015	150	<2	2020		0.30	77.8	1240	<0.09		363	103
Duplicate	147	<2	2040		0.30	77.1	1240	<0.09		366	104
5/26/2015	112	<2	2140		0.30	57.0	1390	<0.09		352	99.7
Duplicate	112	<2	2150		0.30	58.0	1390	<0.09		354	99.7
6/23/2015	133	<2	2130		0.28	50.8	1440	<0.09		368	105
Duplicate	131	<2	2130		0.28	49.4	1450	<0.09		377	107
8/23/2016	179	<0.4	2040	75.4	0.36	128		<0.09		355	95.6
Duplicate	182	<0.4	2090	83.4	0.36	126		<0.09		366	98.6
9/26/2017	149	<0.1	1960	70.4	0.32	137	1150	<90		346	94.9
Duplicate	156	<0.1	1940	74.6	0.33	136	1140	<90		329	89.7
10/11/2022	82	16.00	2500.00	150.00	0.19	490.00	1400.00	<0.13	14.00	480	120.00
Duplicate	79	37.00	2400.00	150.00	0.23	530.00	1500.00	<0.13	14.00	490	130.00
11/28/2023	160	<5.0	2200	75	0.24	390	1100	<0.13	13	420	110
Duplicate	160.00	-47.8	2200	54	0.23	390	1100	<0.13	13	420	110

SAMPLING DATE	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	Si	SiO2	Sr	Tl
3/26/2015	0.0052	0.313	0.0001	56.9	4.07		39.4	0.0016	0.00081	15.9000	0.000013	<0.00005	<0.0001	0.00072	0.00004	<0.0005		9.0		
Duplicate	0.0021	0.308	0.00009	57.6	4.12		38.7	0.0027	0.00073	15.7000	0.00002	<0.00005	<0.0001	0.00064	0.00004	<0.0005		8.9		
4/27/2015	0.0071	0.337	0.00021	64.5	4.32		43.0	<0.001	0.00061	0.0175	0.000014	<0.00005	<0.0001	0.00053	<0.00002	<0.0005		12.7		
Duplicate	0.0070	0.340	0.00014	64.7	4.36		43.6	<0.001	0.00061	0.0167	0.000015	<0.00005	<0.0001	0.00055	<0.00002	<0.0005		12.4		
5/26/2015	0.0016	0.322	<0.00005	67.5	4.20		41.6	<0.001	0.00050	0.0164	0.000016	<0.00005	<0.0001	0.00046	<0.00002	<0.0005		11.3		
Duplicate	0.0033	0.320	0.00007	67.7	4.20		41.7	<0.001	0.00048	0.0165	0.000013	<0.00005	<0.0001	0.00041	0.00004	<0.0005		11.5		
6/23/2015	0.0034	0.356	0.00035	73.9	4.29		46.0	0.0009	0.00042	0.0159	0.000012	<0.00005	<0.0001	0.00028	0.02340	<0.0005		12.0		
Duplicate	0.0042	0.367	0.00027	76.0	4.38		47.3	0.0006	0.00040	0.0161	0.000016	<0.00005	<0.0001	0.00023	0.00004	<0.0005		12.2		
8/23/2016	0.003	0.304		62.7	3.49		63.6	0.004	0.00079	0.0184	<0.00002	<0.00002	0.00008	0.0003	0.00023	<0.0002		11.4		
Duplicate	0.007	0.315		64.6	3.61		65.6	0.005	0.00078	0.0173	<0.00002	0.00006	0.00009	0.0002	0.00005	<0.0002		11.9		
9/26/2017	0.004	0.366	0.00006	47.6	3.16		73.2	.00008	0.0007	0.01530	0.000020	<0.0001	0.00006	0.00031	0.00003	0.00020		11.7		
Duplicate	0.011	0.341	0.00005	44.8	2.97		69.6	.00008	0.0007	0.01570	0.000020	<0.0001	0.00017	0.00029	0.00004	0.00010		11.5		
10/11/2022	<0.034	0.47	<0.0017	94	5	<0.0011	120	<0.015	<0.00075	0.017	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	7.5	16	7.200	<0.00020
Duplicate	<0.034	0.49	<0.0017	96	5.2	<0.0011	120	<0.015	<0.00075	0.017	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	7.6	16	7.500	<0.00020
11/28/2023	<0.034	0.45	<0.0017	72	4.5	<0.0011	130	<0.015	<0.00075	0.018	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	7.9	17	6.3	0.0002
Duplicate	<0.034	0.41	<0.0017	71	4.5	<0.0011	130	<0.015	<0.00075	0.017	<0.00062	<0.00020	<0.0012	0.0032	<0.00045	<0.00089	6.6	14	6.3	<0.00020

MW-1402

SAMPLING	Field Measurements																																			
SAMPLING	Depth to SWL	pH	Cond	Redox	Temperature	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
DATE	ft		microS/cm	mv	°C	mg/L CaCO3	mg/L CaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L	mg/L
Sample Size	43	42	42	41	42	43	43	43	33	43	43	43	43	18	43	43	43	43	43	43	43	18	43	43	43	43	43	43	43	43	43	43	42	11	18	18
Average of detected	107.9	7.54	327.2	-88.6	12.3	164.8	-121.2	190.6	5.5	0.13	0.60	22.4	0.045	1.20	50.1	10.9	0.017	0.054	0.00088	1.49	0.195	0.0004	5.13	0.0055	0.00020	0.194	0.00007	0.00043	0.0001	0.0003	0.00031	0.00003	14.7	7.3	0.160	0.00020
Std.Dev. Of detected	7.6	0.37	23.7	49.7	1.5	10.9	48.7	25.4	10.5	0.02	0.08	7.0	0.000	0.17	2.5	0.7	0.032	0.019	0.00253	0.47	0.025	0.0001	0.31	0.0098	0.00016	0.030	0.00009	0.00105	0.0002	0.0002	0.00093	0.00001	1.7	0.4	0.019	0.00015
Maximum of Detected	150.5	8.80	395.0	70.0	18.0	190.0	2.5	218.0	57.6	0.17	0.80	37.0	0.045	1.62	55.0	12.7	0.140	0.110	0.01300	2.69	0.273	0.0005	5.87	0.0319	0.00080	0.240	0.00018	0.00280	0.0007	0.0009	0.00418	0.00004	17.0	7.7	0.230	0.00032
Median of Detected	107.5	7.49	327.0	-104.1	12.1	160.0	-133.0	190.0	2.9	0.13	0.60	20.9	0.045	1.10	50.3	11.0	0.003	0.048	0.00014	1.30	0.187	0.0004	5.10	0.0012	0.00017	0.203	0.00003	0.00001	0.0001	0.0002	0.00004	0.00004	15.0	7.4	0.160	0.00024
Minimum of Detected	85.0	6.76	271.0	-147.6	10.2	150.0	-166.0	50.0	0.8	0.07	0.46	11.2	0.045	1.00	42.6	9.5	0.001	0.033	0.00005	0.18	0.165	0.0003	4.33	0.0002	0.00007	0.108	0.00000	0.00000	0.0000	0.0001	0.00001	0.00002	7.9	6.2	0.140	0.00003
DL							<2						<0.09															<0.00005	<0.0001			<0.0005				
3/26/2015	108.2	7.41	329	-73	11	159	<2	218		0.17	0.80	31.7	<0.09		52.0	12.7	0.031	0.051	0.00015	2.69	0.273		5.56	<0.001	0.00025	0.148	<0.00001	<0.00005	0.0001	0.00022	0.00006	<0.0005	10.2			
4/13/2015						158	<2	218		0.15	0.70	28.3	<0.09		50.7	12.1	0.004	0.045	0.00009	2.39	0.260		5.53	<0.001	0.00019	0.150	<0.00001	<0.00005	<0.0001	0.00011	0.00012	<0.0005	15.0			
4/27/2015	107.4	7.42	318	-84	11.0	158	<2	204		0.15	0.70	24.6	<0.09		50.3	11.7	0.014	0.047	0.00012	2.46	0.251		5.62	<0.001	0.00020	0.150	<0.00001	<0.00005	0.0001	<0.0001	0.00005	<0.0005	15.0			
5/11/2015	107.6	7.53	320	-108	12.3	156	<2	185		0.15	0.70	24.0	<0.09		47.8	11.2	0.003	0.045	0.00007	2.22	0.237		5.24	<0.001	0.00020	0.149	<0.00001	<0.00005	<0.0001	<0.0001	0.00418	<0.0005	15.6			
5/26/2015	107.4	7.47	311	-101	12.1	156	<2	189		0.14	0.70	19.8	<0.09		46.4	10.6	0.002	0.043	0.00008	2.00	0.218		4.95	<0.001	0.00017	0.145	<0.00001	<0.00005	<0.0001	<0.0001	<0.00002	<0.0005	13.9			
6/9/2015	107.4	7.52	309	-99	11.8	154	<2	190		0.15	0.70	21.0	<0.09		47.1	10.9	0.004	0.043	0.00007	2.01	0.216		5.26	0.001	0.00018	0.150	<0.00001	<0.00005	<0.0001	0.00007	0.00002	<0.0005	14.0			
6/23/2015	106.7	7.52	315	-116.2	12.1	157	<2	191		0.15	0.80	24.1	<0.09		46.5	10.7	0.002	0.048	0.00066	2.08	0.214		4.71	0.001	0.00017	0.149	<0.00001	<0.00005	<0.0001	0.00017	0.00091	<0.0005	15.1			
7/7/2015	106.5	7.41	313	-107.2	11.8	156	<2	203		0.14	0.70	20.9	<0.09		50.7	11.6	0.003	0.054	0.00053	2.25	0.235		4.33	0.001	0.00019	0.155	<0.00001	<0.00005	<0.0001	0.00023	0.00004	<0.0005	14.8			
7/23/2015	106.5	7.43	300	-115.3	12.2	155	<2	185		0.12	0.70	15.6	<0.09		48.3	11.0	0.001	0.044	0.00050	1.99	0.220		5.87	0.002	0.00060	0.177	0.00018	<0.00005	<0.0001	0.00032	0.00006	<0.0005	14.7			
10/12/2015	108.6	7.56	299	-98.6	11.7	158	<2	195		0.10	0.60	13.3	<0.09		48.2	11.0	0.003	0.046	0.00024	1.95	0.210		5.07	<0.002	0.00030	0.160	<0.00001	<0.00005	<0.0001	<0.0002	0.00035	<0.0001	13.8			
3/9/2016	107.8	7.37	324	-124.6	11.5	171	<2	184	20.4	0.14	0.57	13.6	<0.09		42.6	9.5	0.002	0.033	0.00009	1.55	0.174		4.83	0.001	0.00019	0.181	<0.00002	<0.00002	0.00010	0.00041	<0.00002	<0.0001	10.3			
5/17/2016	106.8	7.22	328	-69.4	11.3	179	<2	179	6.2	0.14	0.57	13.8	<0.09		46.0	10.1	<0.002	0.039	0.00011	1.53	0.182		4.92	<0.002	0.00017	0.193	<0.00002	<0.00002	<0.00005	0.00009	0.00002	<0.0001	13.2			
8/23/2016	108.3	7.49	326	-104.1	11.8	<0.4	<0.4	177	2.5	0.14	0.58	13.6	<0.09		48.8	11.0	0.017	0.044	0.00059	1.61	0.183		5.23	0.032	0.00047	0.108	<0.00002	0.00008	0.00020	0.00094	0.000108	<0.0002	16.6			
12/6/2016	109.2	7.40	320	-89.8	11.3	175	<0.4	190	57.6	0.14	0.54	13.2	<0.09		49.6	11.0	0.003	0.090	0.00005	1.44	0.188		5.66	<0.002	0.00018	0.208	<0.000005	0.00001	0.00003	0.00038	0.00001	<0.00003	15.6			
2/21/2017	108.2	7.53	323	-106.7	11.5	175	0.4	180	3.2	0.13	0.46	11.2	0.045		49.0	9.7	0.001	0.050	0.00038	1.32	0.177		4.96	0.0002	0.00013	0.188	0.00003	0.000002	0.00003	0.00032	0.000049	0.000015				
6/13/2017	107.2	7.43	328	-123.1	12.9	164	2.50	182	1.5	0.12	0.49	13.1	0.045		47.6	10.2	0.001	0.064	0.00026	1.32	0.176		5.00	0.0005	0.00014	0.197	0.000004	2.5E-06	0.00006	0.00033	0.00001	0.00004	15.5			
9/12/2017	107.9	7.53	328	-118.4	12.5	174	<0.1	191	3.50	0.12	0.51	15.7	<0.09		49.9	10.6	0.008	0.050	0.00008	1.27	0.184		5.07	0.0007	0.00013	0.206	<0.000004	<0.0001	#####	0.00012	0.000032	<0.00003	14.5			
11/7/2017	108.4	7.30	327	-90.6	11.6	177	< 5	186	2.00	0.13	0.53	14.8	< 0.09		48.7	10.5	0.001	0.053	0.00146	1.28	0.179		5.19	0.0006	0.00011	0.206	< 0.000004	< 0.000005	#####	0.00014	0.000025	< 0.00003	14.6			
2/7/2018	107.8	8.37	326	-86.3	10.3	160	< 5	186	4.80	0.12	0.48	16.1	< 0.09		47.3	9.9	< 0.0008	0.075	0.00009	1.21	0.171		4.77	0.0007	0.00012	0.206	< 0.000004	0.00012	#####	0.00041	0.00001	< 0.00003	14.8			
5/2/2018	150.5	7.60	325	-121.1	12.4	188	< 5	188	0.80	0.14	0.60	17.4	< 0.002	1.62	52.5	10.8	0.001	0.110	0.00012	1.41	0.193	0.00032	5.36	0.002	0.00010	0.196	< 0.000004	0.000006	#####	0.00010	0.00008	< 0.00003	16.3		0.152	0.00003
7/11/2018	106.7	8.80	327	-140.5	12.4	178	< 5	186	3.3	0.14	0.60	17.4	< 0.002	1.10	49.4	10.1	< 0.0008	0.094	0.00005	1.24	0.176	0.00049	5.09	0.0004	0.00010	0.203	< 0.000004	< 0.000005	#####	0.00035	0.000006	< 0.00003	15.4		0.160	< 0.00001
10/17/2018	106.5	7.90	328	-119.7	11.8	179	< 8	199	3.8	0.13	0.58	16.4	< 0.002	1.32	48.5	10.2	0.013	0.090	0.00009	1.28	0.178	< 0.0004	4.82	0.002	0.00011	0.212	< 0.00002	< 0.00001	0.00005	0.0002	< 0.00002	< 0.00003	14.9		0.154	< 0.0001
2/13/2019	105.0	8.12	329	-105.5	10.2	180	< 8	186	6.4	0.12	0.6	17.5	< 0.002	1.51	52.5	11.2	0.0285	0.060	0.00017	1.55	0.187	< 0.0004	5.79	< 0.0007	0.00012	0.224	< 0.00002	< 0.00001	0.00020	0.00012	0.00004	< 0.00003	15.5		0.168	< 0.0001
5/15/2019	105.3	8.01	330	-125.3	12.2	178	< 8	199	2.0	0.13	0.55	19.3	< 0.002	1.13	51.6	10.4	< 0.001	0.050	< 0.00002	1.28	0.187	< 0.0004	4.94	< 0.0007	0.00007	0.198	< 0.00002	< 0.00001	0.00006	0.00024	< 0.00002	< 0.00003	16.0		0.156	< 0.0001
8/21/2019	106.6	7.40	330	-147.6	15.1	169	< 8	200	1.9	0.12	0.57	19.1	< 0.002	1.05	49.6	10.7	0.040	< 0.1	< 0.001	1.28	0.179	< 0.002	5.12	< 0.004	< 0.0002	0.212	< 0.0001	< 0.00005	0.0004	< 0.0005	< 0.0002	< 0.0002	14.3		0.157	< 0.0005
11/20/2019	108.1	7.20	327	-114.0	11.4	165	< 8	215	2.0	0.12	0.59	20.1	< 0.002		51.1	10.8	< 0.005	0.051	< 0.0002	1.16	0.177		4.79	< 0.0007	0.00009	0.212	< 0.00002	< 0.00001	#####	0.0002	< 0.00005	0.00004	14.5			
2/19/2020	107.2	7.69	284	-134	11.3	179	< 8	209	2.2	0.12	0.56	20.9	< 0.002		52.2	11.1	< 0.005	0.040	< 0.0002	1.25	0.165		4.93	< 0.0007	0.00008	0.204	< 0.00002	< 0.00001	0.00010	0.0002	< 0.00005	< 0.00003	15.4			
4/29/2020	105.3	8.17	286	-116	12.0	164	< 8	206	2.0	0.11	0.57	20.8	< 0.002		50.3	10.8	< 0.005	0.040	< 0.0002	1.24	0.180		5.05	0.003	0.00007	0.221	< 0.00002	< 0.00001	0.00006	0.0001	< 0.00005	< 0.00003	14.6			
CIP took over sampling																																				
9/22/2020	108.10	7.86	312		13.20	155	-100	205	3	0.15	0.60	24.9	<0.2		51.6	11.0	<0.05	0.037	<0.002	1.22	0.197		5.14	0.02	<0.005	0.211	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	7.9			
11/23/2020	108.60	7.23	343	-122	11.53	150	-127	190	<4	0.13	0.61	25.0	<0.2		48.0	10.0	<0.05	0.042	<0.002	1.20	0.170		5.30	<0.02	<0.005	0.200	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	15.0			
1/14/2021	108.13	7.20	358	-8	11.25	160	-138	210	5	0.13	0.61	26	<0.13		49.0	11	<0.034	0.038	<0.0017	1.2	0.18		4.9	<0.015	<0.00075	0.2	<0.00031	<0.00020	<0.00098	<0.0015	<0.00045	<0.00089	15			
4/5/2021	107.82	7.47	331	-86	12.33	160	-152	210	<1.0	0.12	0.62	26	<0.13	1.4	51.0	11	<0.047	0.048	<0.0035	1.3	0.18	<0.0049	4.6	<0.0097	<0.0041	0.2	<0.00060	<0.00020	0.00068	<0.0022	<0.0028	<0.00089	16	7.6	0.16	0.00032
8/9/2021	107.52	7.96	297	64	16.43	160	-152	180	1	0.14	0.74	28	<0.13	1.3	50.0	10	0.071	<0.057	0.013	1.3	0.18	<0.0011	5.3	0.027	0.0008	0.2	<0.00062	0.002800	<0.0025	<0.0015	<0.00045	<0.00089	13		0.23	<0.00020
11/3/2021	108.32	7.48	271	-36	12.28	150	-124	200	<1.0	0.13	0.54	27	<0.13	1.2	53.0	12	<0.034	0.080	<0.0017	1.3	0.2	<0.0011	5.4	<0.015	<0.00075	0.23	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	15	7.2	0.16	<0.00020
3/31/2022	105.29	7.38	345	-12	12.44	160	-133	190	2.2	0.13	0.67	29	<0.13	1.1	52.0	11	<0.016	0.044	<0.0011	1.3	0.18	<0.00061	5.3	0.0031	<0.00028	0.22	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	16	7.7	0.15	<0.00047
4/4/2022	105.66	7.52	357	-66	11.19	150	-135	190	2.7	0.14	0.67	29	<0.13	1.1	54.0	11	<0.016	0.042	<0.0011	1.3	0.18	<0.00061	5.1	<0.0029	<0.00028	0.23	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	15	7	0.16	<0.00047
7/18/2022	84.97	7.55	334	70	14.01	160	-132	50	4.6	0.12	0.65	30	<0.13	1.1	52.0	11	<0.034	<0.057	0.0021	0.77	0.19	<0.0011	5.3	<0.015	<0.00075	0.21	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	16	7.6	0.15	<0.00020
10/10/2022	108.23	7.53	339	0	13.29	160	-133	190	2.3	0.12	0.61	31	<0.13	1.1	53.0	11	<0.034	<0.057	<0.0017	1.2	0.19	<0.0011	5.0	<0.015	<0.00075	0.21	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	16	7.2	0.14	<0.00020
3/21/2023	107.89	7.14	361	-124	12.58	150	-139	200	3.1	0.066	0.47	32	<0.13	1.1	53.0	11	<0.034	<0.057	0.0018	0.18	0.19	<0.0011	5.1	<0.015	<0.00075	0.22	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	17	7.7	0.16	<0.00020
4/13/2023	107.28	6.98	367	-100	13.31	190	-166	200	3.0	0.11	0.57	33	<0.13	1.1	53.0	11	<0.034	<0.057	<0.0017	1.2	0.20	<0.0011	5.0	<0.015	<0.00075	0.23	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	16	7.4	0.16	<0.00020
8/21/2023	107.92	7.03	368	-96	14.35	160	-165	150	2.2	0.10	0.53	34	<0.13	1.0	53.0	11	<0.034	<0.057	<0.0017	1.3	0.19	<0.0011	4.9	<0.015	<0.00075	0.23	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	16	7.5	0.16	<0.00020
11/28/2023	108.93	6.76	395	-44	11.27	<2.6	-128	200	2.4	0.10	0.52	33	<0.13	1.2	55.0	12	<0.034	<0.057	<0.0017	1.3	0.20	<0.0011	5.2	<0.015	<0.00075	0.24	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	13	6.2	0.16	0.00024
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																				
5/20/2024	106.70	7.70	355	-135	17.95	170	-140	210	8.3	0.11	0.54	37	<0.13	1.1	52.0	12	0.14	<0.057	<0.0017	1.9	0.18	<0.0011	5.3	<0.015	<0.00075	0.22	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	15	6.9	0.14	<0.00020

Record of Duplicates

	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
4/13/2015	159	<2	216		0.15	0.7	28.3	<0.2		50.2	11.9	0.0025	0.043	0.00008	2.36	0.256		5.47	<0.001	0.00018	0.149	<0.00001	<0.00005	<0.0001	0.00011	0.000217	<0.0005	14.8			
Duplicate	157	<2	220		0.15	744	28.3	<0.2		51.1	12.2	0.0048	0.046	0.00009	2.41	0.263		5.58	<0.001	0.0002	0.15	<0.00001	<0.00005	<0.0001	0.00011	0.000026	<0.0005	15.2			
5/11/2015	155	<2	168		0.15	0.7	23.8	<0.2		47.4	11.1	0.0029	0.045	0.00006	2.200	0.235		5.2	<0.001	0.00019	0.146	<0.00001	<0.00005	<0.0001	<0.0001	0.00344	<0.0005	15.50			
Duplicate	156	<2	202		0.15	0.7	24.1	<0.2		48.1	11.2	0.0034	0.044	0.00007	2.240	0.238		5.2	<0.001	0.0002	0.149	<0.00001	<0.00005	<0.0001	<0.0001	0.00418	<0.0005	15.60			
6/9/2015	154	<2	190		0.14	0.7	21	<0.2		47	10.9	0.0032	0.043	0.00006	2.01	0.216		5.28	0.0004	0.00017	0.152	<0.00001	<0.00005	<0.0001	0.00004	0.00002	<0.0005	14			
Duplicate	154	<2	189		0.15	0.7	20.9	<0.2		47.1	10.9	0.0041	0.043	0.00007	2	0.216		5.24	0.0009	0.00018	0.148	<0.00001	<0.00005	<0.0001	0.00009	0.000021	<0.0005	14			
	157	<2	195		0.13	0.7	21.1	<0.2		50.4	11.5	0.0028	0.054	0.00046	2.21	0.233		4.27	0.0009	0.00019	0.153	<0.00001	<0.00005	<0.0001	0.00021	0.00005	<0.0005	14.9			
	155	<2	210		0.14	0.7	20.6	<0.2		51	11.7	0.0034	0.054	0.0006	2.28	0.237		4.38	0.0014	<0.0001	0.157	<0.00001	<0.00005	<0.0001	0.00025	0.000028	<0.0005	14.7			
10/12/2015	157	<2	195		0.100	0.600	13.1	<0.2		49.0	11.1	0.004	0.046	0.00029	1.98	0.212		5.17	<0.002	0.00031	0.164	0.000003	<0.00005	<0.0001	<0.0002	0.00052	<0.0001	13.7			
Duplicate	158	<2	194		0.100	0.600	13.5	<0.2		47.3	10.8	0.002	0.045	0.00018	1.92	0.208		4.96	<0.002	0.00029	0.156	<0.000002	<0.00005	<0.0001	<0.0002	0.00019	<0.0001	13.9			
6/13/2017	161	<5	185	2	0.12	0.49	13.1	<0.09		47.4	10.1	0.001	0.068	0.00032	1.31	0.176		4.99	0.0005	0.00014	0.199	0.000004	<0.000005	5.8E-05	0.0004	0.00001	<0.00003	15.4			
Duplicate	167	<5	179	1	0.12	0.49	13	<0.09		47.8	10.3	<0.0008	0.06	0.00019	1.32	0.176		5.01	<0.0004	0.00013	0.194	<0.000004	<0.000005	6.6E-05	0.00026	0.000007	0.00004	15.5			
11/3/2021	150	-124	200	<1.0	0.13	0.54	27	<0.13	1.2	53.0	12	<0.034	0.080	<0.0017	1.3	0.2	<0.0011	5.4	<0.015	<0.00075	0.23	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	15	7.2	0.16	<0.00020
Duplicate	160	-128	170	4.0	0.10	0.51	27	<0.13	1.1	52.0	11	<0.034	0.072	<0.0017	1.3	0.2	<0.0011	5.2	<0.015	<0.00075	0.22	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	15	7.2	0.16	<0.00020
3/31/2022	160	-133	190	2.2	0.13	0.67	29	<0.13	1.1	52.0	11	<0.016	0.044	<0.0011	1.3	0.18	<0.00061	5.3	0.0031	<0.00028	0.22	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	16	7.7	0.15	<0.00047
Duplicate	160	-122	190	2.9	0.14	0.67	29	<0.13	1.1	53.00	11	<0.016	0.049	<0.0011	1.3	0.18	<0.00061	5.4	<0.0029	<0.00028	0.23	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	16	7.6	0.15	<0.00047
10/10/2022	160	-133	190	2.3	0.12	0.61	31	<0.13	1.1	53.00	11	<0.034	<0.057	<0.0017	1.2	0.19	<0.0011	5	<0.015	<0.00075	0.21	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	16	7.2	0.14	<0.00020
Duplicate	160	-100	180	3.5	0.12	0.61	31	<0.13	1.1	52.00	11	<0.034	<0.057	<0.0017	1.2	0.19	<0.0011	4.8	<0.0015	<0.00075	0.210	<0.0062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	15	7.1	0.14	<0.00020
11/28/2023	<2.6	-128	200	2.4	0.10	0.52	33	<0.13	1.2	55.00	12	<0.034	<0.057	<0.0017	1.3	0.20	<0.0011	5.2	<0.015	<0.00075	0.24	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	13	6.2	0.16	0.00024
Duplicate	160	-160	200	2.6	0.098	0.52	33	<0.13	1.1	54.00	12	<0.034	<0.057	<0.0017	1.3	0.20	<0.0011	5.2	<0.015	<0.00075	0.23	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	16	7.3	0.15	0.00041

MW-1403

SAMPLING DATE	Field Measurements: Depth to SWL ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L
Sample Size	42	42	42	42	42	43	43	43	33	43	43	43	43	18	43	43	43	43
Average of detected	181.9	6.6	3662.3	-35.6	14.0	339.3	18.4	3511.7	209.4	0.32	53.0	2279.4	0.07	16.44	434.30	133.06	0.109	22.389
Std.Dev. Of detected	24.1	0.5	864.1	50.1	2.9	186.5	243.8	996.2	264.3	0.15	62.5	713.5	0.04	2.28	106.95	50.64	0.387	141.71
Maximum of Detected	191.4	7.5	5985.0	117.0	25.7	941.0	620.0	6140.0	1100.0	0.96	301.0	3980.0	0.10	19.0	759.0	230.0	2.100	930.00
Median of Detected	188.4	6.7	3645.0	-44.7	13.1	348.0	36.0	3400.0	102.0	0.28	26.9	2120.0	0.07	17.00	454.00	120.00	0.006	0.71
Minimum of Detected	97.6	5.7	1980.0	-110.8	10.6	53.0	-481.0	1890.0	20.8	0.10	2.4	1080.0	0.05	11.90	256.00	51.80	0.002	0.37
% of Detected	95.2	100.0	100.0	21.4	100.0	100.0	25.6	100.0	100.0	97.7	100.0	100.0	4.65	100.00	100.00	100.00	69.77	100.0
DL							<2						<0.09					
3/25/2015	189.4	6.95	4392	-69.8	12.1	670	<2	4180		0.27	301	2120	<0.09		404	129	0.003	0.874
4/13/2015						941	<2	3650		0.26	198	2070	<0.09		383	119	0.004	0.823
4/28/2015	188.0	6.90	3684	-47.0	12.7	385	<2	3380		0.26	160	2020	<0.09		364	113	0.005	0.780
5/11/2015	188.4	6.93	3499	-57.5	14.8	348	<2	3080		0.29	142	1970	<0.09		319	100	0.002	0.666
5/26/2015	188.0	6.95	3206	-62.9	12.9	280	<2	2970		0.27	118	1900	<0.09		306	96.2	0.003	0.594
6/9/2015	188.3	7.01	3206	-81.4	13.8	246	<2	2780		0.26	100	1870	<0.09		304	94.2	0.002	0.536
6/23/2015	186.7	7.00	3100	-78.1	13.3	230	<2	2740		0.29	94.1	1850	<0.09		290	91.8	0.002	0.535
7/7/2015	186.8	7.03	3036	-89.8	13.3	220	<2	2900		0.28	89.9	1860	<0.09		315	97.7	0.003	0.562
7/23/2015	187.4	7.08	3011	-89.8	13.2	222	<2	2760		0.26	86.2	1820	<0.09		293	91.5	0.005	0.502
10/12/2015	191.2	7.16	3289	-102.0	13.1	311	<2	3140		0.20	96.5	1750	<0.09		331	103	0.029	0.644
3/6/2016	189.4	6.90	5220	-44.1	13.0	500	<2	4260	48.2	0.30	109	2620	<0.09		407	119	0.002	0.781
5/17/2016	189.1	6.91	5985	-76.6	12.6	608	<2	5320	87.6	0.24	88.5	3230	<0.09		483	134	0.004	0.909
8/23/2016	190.5	7.26	3393	-91.0	13.8	712	<0.4	2610	20.8	0.96	17.9	1370	<0.09		256	67.2	0.007	0.708
12/6/2016	191.4	6.66	2808	-30.5	12.2	623	<0.4	2275	195	0.52	3.35	1255	<0.09		378	69.4	0.011	0.394
2/21/2017	190.5	6.61	2548	-42.4	12.7	554	0.2	2040	110	0.44	2.79	1080	0.10		343	51.8	0.004	0.372
6/13/2017	189.1	7.25	2820	-89.7	13.9	425	2.5	3150	102	0.43	2.89	1970	0.05		465	86.7	0.010	0.745
9/12/2017	190.2	6.83	3277	-28.4	13.6	158	<0.1	2920	50.5	0.37	2.95	2000	<0.09		493	94.9	0.0082	0.507
11/7/2017	190.2	6.47	3139	-36.5	12.0	361	< 5	2850	70.1	0.47	2.81	1900	< 0.09		469	97.5	0.0124	0.543
2/7/2018	189.9	6.77	2403	-53.6	11.7	424	< 5	1890	89.2	0.47	2.44	1210	< 0.09		296	61.3	< 0.002	0.501
5/2/2018	186.1	6.52	2400	-67.6	13.1	363	< 5	1970	78.8	0.55	3.22	1260	< 0.002	12.7	307	68.2	#####	0.575
7/11/2018	188.4	7.23	3030	-74.3	13.1	140	< 5	2950	51.6	0.42	2.59	1920	< 0.002	13.6	454	97.1	#####	0.716
10/17/2018	188.4	6.71	2530	-57.8	12.7	322	< 8	2190	66.4	0.44	2.53	1320	< 0.002	11.9	348	77.8	0.309	0.528
2/13/2019	184.7	6.99	2410	-38.7	11.6	400	< 8	2070	110	0.37	2.47	1190	< 0.002	12	321	71.6	#####	0.792
5/15/2019	186.6	7.50	4290	-110.8	12.8	362	< 8	4940	88.9	0.10	22.1	3230	< 0.002	18.5	759	157	0.0062	0.665
8/21/2019	188.1	6.10	4700	-60.8	14.9	421	< 8	6140	153	< 0.04	5.50	3980	< 0.002	18.2	513	173	0.070	0.583
11/20/2019	188.6	6.00	4920	-45.2	11.5	403	< 8	5180	205	0.10	9.98	3710	< 0.002		624	230	< 0.005	0.602
2/19/2020	187.7	6.13	4080	-40	12.4	451	< 8	5220	86.8	0.20	14.3	3410	< 0.002		567	215	0.006	0.561
4/29/2020	186.1	6.57	3850	-48	12.7	351	< 8	4800	159	0.21	25.1	3230	< 0.002		485	184	0.006	0.490
CIP took over sampling																		
9/22/2020	189.56	6.00	1980	48	17.04	233	128	3750	99	0.43	26.9	3000	<0.2		508	181	0.042	0.998
11/23/2020		5.81	4410	0	11.92	160	110	4300	280	0.16	37.0	2800	<0.2		480	170	<0.05	0.96
3/15/2021	188.60	5.74	4310	47	10.55	170	160	3900	250	0.24	51	2700	<0.13		420	150	<0.034	930
4/7/2021	189.10	5.76	3940	29	12.58	96	240	3400	57	0.23	70	2700	<0.13	18	470	150	0.320	0.89
9/9/2021	188.11	6.56	3280	-22	17.32	99	66	2800	220	0.24	86	2100	<0.13	17	400	120	2.100	0.62
10/13/2021	189.65	6.37	3610	3	14.54	140	36	3400	83	0.22	78	2300	<0.13	17	480	150	<0.034	0.75
3/17/2022	186.5	6.07	3680	45	19.9	140	-45.1	3600	71	0.24	48	2300	<0.13	17	540	170	0.270	0.76
6/8/2022	187.9	6.41	3990	-16	25.7	210	-5.46	3700	850	0.28	38	2500	<0.13	16	440	160	<0.034	0.67
8/15/2022	190.02	6.49	4320	71	21.3	200	120	4500	300	0.42	14	3000	<0.13	19	560	230	<0.034	1.2
10/31/2022	N/A	6.26	4390	117	15	53.00	-87.70	4300	970	0.32	12.00	3100	<0.13	18	540	220	<0.034	1.5
3/23/2023	188.90	6.26	4710	-37	12.9	110	61	4000	120	0.21	10	2800	<0.13	18	530	200	<0.034	1.4
5/15/2023	97.60	7.16	4550	-64	19.1	330	620	4200	96	0.39	16	2700	<0.13	17	500	180	<0.034	1.5
8/31/2023	98.45	5.73	4140	-4	13.4	380	-239	3800	1100	0.14	21	2400	<0.13	17	480	170	<0.034	1.4
11/15/2023	99.67	6.94	4150	-31	14.67	390	-372	3500	150	0.25	34	2200	<0.13	17	500	170	<0.034	1.4
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																		
6/10/2024	191.00	6.49	4130	25	14.41	450	-481	3500	490	0.40	30	2300	<0.13	18	550	210	<0.034	1.2

SAMPLING DATE	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si	Sr mg/L	Tl mg/L
Sample Size	43	43	43	18	43	43	43	43	43	43	43	43	43	43	43	12	18	18
Average of detected	0.00054	138.87	5.10	0.0002	305.4	0.0071	0.0010	0.0133	0.000138	0.00016	0.00047	0.00539	0.000426	0.0002	12.9	7.5	14.2	0.00376
Std.Dev. Of detected	0.00090	108.40	4.18	0.0000	180.8	0.0103	0.0007	0.0119	0.000224	0.00020	0.00071	0.00826	0.000951	0.0003	3.5	1.0	3.5	0.00529
Maximum of Detected	0.00320	404.00	17.80	0.0002	893.0	0.0410	0.0034	0.0700	0.000940	0.00073	0.00380	0.04250	0.003830	0.0014	20.2	9.1	18.0	0.00750
Median of Detected	0.00012	150.00	4.50	0.0002	270.0	0.0019	0.0008	0.0113	0.000080	0.00008	0.00026	0.00165	0.000047	0.0001	12.4	7.4	16.0	0.00376
Minimum of Detected	0.00004	1.42	0.84	0.0002	84.6	0.0004	0.0003	0.0046	0.000007	0.00001	0.00006	0.00015	0.000010	0.0000	7.1	6.2	7.5	0.00002
% of Detected	62.8	100.0	97.7	11.1	100.0	65.1	74.4	100.0	53.5	37.2	67.4	97.7	51.2	41.9	100.0	100.0	100.0	11.1
DL											<0.0001			<0.0005				
3/25/2015	0.00006	5.90	1.24		560	0.0011	0.0025	0.0083	0.000015	<0.00005	0.00090	0.00082	0.000037	<0.0005	10.1			
4/13/2015	0.00017	9.89	1.28		564	0.0018	0.0014	0.0101	0.000014	0.000050	0.00080	0.00064	0.000048	<0.0005	13.5			
4/28/2015	0.00012	9.68	1.27		536	<0.001	0.0010	0.0099	0.000011	<0.00005	0.00070	0.00048	0.000031	<0.0005	13.5			
5/11/2015	0.00006	9.88	1.14		478	<0.001	0.0008	0.0109	<0.00001	<0.00005	0.00070	0.00034	0.00383	<0.0005	13.8			
5/26/2015	0.00008	10.60	1.10		446	<0.001	0.0006	0.0114	0.000014	<0.00005	0.00040	0.00030	<0.00002	<0.0005	11.4			
6/9/2015	0.00006	11.30	1.11		440	0.0007	0.0007	0.0115	<0.00001	<0.00005	0.00030	0.00023	0.000021	<0.0005	10.8			
6/23/2015	0.00031	10.00	1.05		342	0.0012	0.0003	0.0119	<0.00001	<0.00005	0.00030	0.0003	0.000831	<0.0005	11.3			
7/7/2015	0.00021	11.40	1.18		371	0.0010	0.0004	0.0119	<0.00001	<0.00005	0.00020	0.0003	0.000051	<0.0005	10.8			
7/23/2015	0.00023	10.70	1.10		448	0.0014	0.0034	0.0127	0.000013	<0.00005	0.00020	0.0003	0.000027	<0.0005	11.0			
10/12/2015	0.00035	9.91	1.23		478	<0.002	0.0013	0.0113	0.000007	<0.00005	0.00030	0.0004	0.000366	0.0001	11.7			
3/6/2016	0.00012	14.40	1.53		708	0.0010	0.0009	0.0067	<0.00004	<0.00002	0.00030	0.0008	<0.00002	0.0002	7.1			
5/17/2016	0.00010	16.20	1.52		893	0.0020	0.0010	0.0057	<0.00004	<0.00004	0.00040	0.0006	<0.00004	0.0001	11.0			
8/23/2016	0.00060	1.42	0.84		657	0.0020	0.0012	0.0168	<0.00002	<0.00002	0.00030	0.0023	0.00007	<0.0002	20.2			
12/6/2016	0.00012	48.65	2.76		212	0.0015	0.0014	0.0215	0.000042	0.000010	0.00020	0.0007	0.00002	0.0001	19.8			
2/21/2017	0.00038	87.3	2.91		128	0.0010	0.0007	0.0197	0.000070	0.000010	0.00020	0.0037	0.00003	0.0001	15.6			
6/13/2017	0.00021	152	5.22		133	0.0004	0.0008	0.0168	0.000056	0.000005	0.00025	0.0007	0.00001	0.00007	12.4			
9/12/2017	0.00010	136	6.69		136	<0.0001	0.0008	0.0171	0.000071	0.000100	0.00010	0.0013	0.00004	0.00009	8.3			
11/7/2017	0.00009	170	7.79		125	0.0007	0.0007	0.0173	0.000108	0.000010	0.00020	0.0014	0.000053	0.00007	9.5			
2/7/2018	0.00004	153	5.28		84.6	0.0008	0.0005	0.0212	0.000129	0.000010	0.00007	0.0006	0.0002	0.00009	8.4			
5/2/2018	0.00008	137	4.80	0.00017	122	0.001	0.0005	0.0174	0.000042	0.000005	0.00013	0.0002	0.00005	0.00005	9.8		8.1	0.00002
7/11/2018	0.00009	188	6.86	0.0002	112	0.0009	0.0006	0.0127	0.000109	< 0.00001	0.00013	0.0012	0.000045	0.0001	10.4		10.5	< 0.00002
10/17/2018	0.00078	175	5.81	< 0.0008	84.8	0.004	0.0014	0.0221	0.000100	0.000020	0.00082	0.0020	0.000689	0.0001	9.9		7.51	< 0.0002
2/13/2019	0.00009	154	5.01	< 0.0004	92.5	< 0.0007	0.0003	0.0162	0.000080	0.000020	0.00006	0.0003	0.00003	< 0.00003	8.8		7.6	< 0.0001
5/15/2019	< 0.00002	295	12.20	< 0.0004	159	0.002	0.0006	0.0060	0.000090	< 0.00001	0.00010	0.0037	< 0.00002	0.00004	13.3		17.3	< 0.0001
8/21/2019	< 0.001	320	13.6	< 0.002	192	0.0256	0.0009	0.0115	0.000200	0.000350	0.00130	0.0425	< 0.0002	0.0002	9.8		15.3	< 0.0005
11/20/2019	< 0.0002	404	17.8		202	0.0030	0.0008	0.0046	0.000141	< 0.00001	0.00026	0.0207	< 0.00005	0.00009	10.9			
2/19/2020	< 0.0002	281	14.60		236	0.0030	0.0006	0.0057	0.000126	0.000120	0.00009	0.0173	< 0.00005	0.00007	11.7			
4/29/2020	< 0.0002	249	12.50		229	0.0086	0.0006	0.0074	0.000090	0.000130	0.00009	0.0139	< 0.00005	0.00004	10.0			
CIP took over sampling																		
9/22/2020	<0.002	260	9.74		253	0.020	<0.005	0.0062	<0.001	<0.001	<0.002	0.0105	<0.001	<0.005	7.8			
11/23/2020	<0.002	240	8.00		270	<0.02	<0.005	0.0052	<0.001	<0.001	<0.002	0.0039	<0.001	<0.005	17.0			
3/15/2021	<0.0017	220	7.00		230	<0.015	0.00088	0.005	0.00070	<0.00020	<0.00098	0.0092	<0.0045	<0.00089	14			
4/7/2021	<0.0035	240	6.80	<0.0049	240	0.016	0.00110	0.012	0.00094	0.000300	<0.0063	0.0170	<0.0028	0.0014	14	6.8	14	0.0075
9/9/2021	0.00320	190	3.30	<0.0011	260	0.024	0.00300	0.051	<0.00062	<0.00020	0.0038	0.0190	0.0026	<0.00089	19	9.1	13	<0.00020
10/13/2021	<0.0017	150	5.60	<0.0011	280	<0.015	<0.00075	0.0078	<0.00062	<0.00020	<0.0025	0.0055	<0.00045	<0.00089	13	6.2	16	<0.00020
3/17/2022	0.00170	100	5.00	<0.00061	270	0.014	0.00063	0.012	<0.00027	0.000350	<0.0015	0.0120	0.00046	<0.00074	14	6.5	18	<0.00047
6/8/2022	0.00210	110	4.20	<0.0011	210	0.041	<0.00075	0.070	<0.00062	0.000730	<0.0025	0.0110	<0.00045	<0.00089	14	6.3	14	<0.00020
8/15/2022	0.00310	260	7.80	<0.0011	270	0.019	<0.00075	0.0052	<0.00062	0.000340	<0.0025	0.0073	<0.00045	<0.00089	14	6.7	16	<0.00020
10/31/2022	<0.0017	300	6.60	<0.0011	280	<0.015	<0.00075	0.0059	<0.00062	<0.00020	<0.0025	0.0037	<0.00045	<0.00089	14	7.5	16	<0.00020
3/23/2023	<0.0017	240	4.90	<0.0011	270	<0.015	<0.00075	0.0065	<0.0062	<0.00020	<0.0025	0.0029	<0.00045	<0.00089	18	8.3	16	<0.00020
5/15/2023	<0.0017	190	3.90	<0.0011	270	<0.015	<0.00075	0.0067	<0.00062	<0.00020	<0.0012	0.0016	<0.00045	<0.00089	16	7.2	16	<0.00020
8/31/2023	<0.0017	160	3.30	<0.0011	290	<0.015	<0.00075	0.0073	<0.00062	<0.00020	<0.0012	0.0017	<0.00045	<0.00089	18	8.3	16	<0.00020
11/15/2023	<0.0017	110	3.00	<0.0011	300	<0.015	<0.00075	0.0076	<0.00062	<0.00020	<0.0012	0.0035	<0.00045	<0.00089	18	8.4	17	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																		
6/10/2024	<0.0017	120	2.40	<0.0011	270	<0.015	<0.00075	0.0058	<0.00062	<0.00020	<0.00012	<0.0015	<0.00045	<0.00089	19	8.7	18	<0.00020

Record of Duplicates

	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B
12/6/2016	632	<0.4	2290	204	0.52	3.36	1240	<0.09		376	68.6	0.01	0.384
duplicate	613	<0.4	2260	186	0.51	3.33	1270	<0.09		380	70.2	0.01	0.403
9/9/2021	99	66	2800	220	0.24	86	2100	<0.13	17	400	120	2.100	0.620
9/9/2021 Duplicate	99.00	110	2900	210	0.25	86	2100	<0.13	16	390	110	2.2	0.620

	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
12/6/2016	0.00012	50	2.8		204	0.002	0.0014	0.022	0.000045	0.00001	0.0002	0.00075	0.000023	0.00005	19.3			
duplicate	0.00012	47.3	2.72		219	0.001	0.0015	0.0209	0.000038	0.00001	0.0002	0.00058	0.000026	0.0001	20.2			
9/9/2021	0.00320	190	3.30	<0.0011	260	0.024	0.0030	0.051	<0.00062	<0.00020	0.0038	0.01900	0.002600	<0.00089	19	9.1	13	<0.00020
9/9/2021 Duplicate	0.00300	180	3.20	<0.0011	250	0.023	0.0033	0.055	<0.00062	<0.00020	0.0040	0.01900	0.00260	<0.00089	20	9.2	12	<0.00020

MW-1404

	Field Measurements																																			
SAMPLING	Depth to SWL	pH	Cond	Redox	Temperature	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
DATE	ft		microS/cm	mv	°C	mg/L CaCO3	mg/L CaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/l	mg/L	mg/L
Sample Size	42	42	42	41	42	43	43	43	33	43	43	43	43	18	43	43	43	43	43	43	43	18	43	43	43	43	43	43	43	43	43	43	43	12	18	18
Average of detected	237.65	7.42	433.00	-55.36	13.23	151.65	-115.87	276.79	14.11	0.17	5.38	87.16	0.073	1.57	45.51	14.09	0.00740	0.084	0.00050	6.23	0.232	0.00	29.55	0.0116	0.0009	0.318	0.00023	0.00014	0.00010	0.00064	0.00082	0.00002	11.47	5.72	0.247	0.00001
Std.Dev. Of detected	3.37	0.40	179.79	78.39	1.76	19.73	76.86	142.74	23.32	0.04	3.35	106.36	0.039	0.16	22.01	7.72	0.01447	0.031	0.00086	9.04	0.216	0.00	11.17	0.0253	0.0004	0.169	0.00027	0.00021	0.00005	0.00041	0.00217	0.00001	1.49	0.44	0.064	NA
Maximum of Detected	256.85	8.49	735.00	163.00	17.62	183.00	11.00	540.00	120.00	0.25	12.40	272.00	0.100	1.90	87.10	28.70	0.06000	0.189	0.00330	26.80	0.626	0.00	57.40	0.0997	0.0018	0.520	0.00058	0.00051	0.00028	0.00157	0.00980	0.00003	14.00	6.40	0.310	0.00001
Median of Detected	237.27	7.30	328.35	-88.40	13.15	155.00	-119.00	197.00	7.50	0.18	4.19	17.70	0.073	1.50	33.30	9.17	0.00238	0.073	0.00017	0.99	0.120	0.00	25.00	0.0016	0.0008	0.386	0.00017	0.00002	0.00010	0.00076	0.00003	0.00002	11.90	5.75	0.258	0.00001
Minimum of Detected	234.90	6.65	242.00	-146.80	9.48	114.00	-303.00	80.00	0.30	0.09	0.87	2.80	0.045	1.40	0.05	7.90	0.00040	0.054	0.00003	0.06	0.000	0.00	16.00	0.0002	0.0001	0.075	0.00002	0.00001	0.00004	0.00010	0.00001	0.00002	5.43	4.90	0.004	0.00001
% of Detected	90	100	100	15	100	100	7	100	94	98	100	100	5	94	100	98	60	77	65	93	100	61	98	42	77	100	9	14	37	65	51	7	98	100	100	6
DL							<2						<0.09															<0.00005	<0.0001			<0.0005				
3/25/2015	237.88	7.12	691	-120.6	12.10	116	<2	496		0.20	8.20	245	<0.09		79.9	27.10	0.00150	0.065	0.00007	26.8	0.600		33.7	<0.001	0.0017	0.098	<0.00001	<0.00005	<0.0001	0.00049	0.000020	<0.0005	7.6			
4/13/2015						114	<2	460		0.10	9.50	265	<0.09		80.3	26.60	0.00260	0.069	0.00018	24.2	0.592		37.6	0.0014	0.0013	0.088	<0.00001	<0.00005	<0.0001	0.00084	0.000033	<0.0005	<0.05			
4/28/2015	237.33	7.15	719	-110.7	12.40	127	<2	440		0.10	8.90	256	<0.09		80.8	26.60	0.01340	0.078	0.00021	18.9	0.586		43.4	0.0018	0.0014	0.081	<0.00001	<0.00005	0.00010	0.00157	0.000125	<0.0005	10.8			
5/11/2015	237.20	7.09	719	-91.3	13.50	116	<2	468		0.20	10.40	266	<0.09		77.0	25.50	0.00130	0.082	0.00006	16.5	0.563		47.7	<0.001	0.0012	0.075	<0.00001	<0.00005	<0.0001	0.00094	0.003290	<0.0005	11.5			
5/26/2015	237.07	7.11	723	-109.7	13.70	119	<2	518		0.10	9.40	267	<0.09		80.2	26.60	0.00210	0.067	0.00005	22.0	0.586		38.1	0.0525	0.0010	0.181	<0.00001	<0.00005	<0.0001	0.00092	0.001270	<0.0005	10.1			
6/9/2015	237.00	7.09	735	-112.7	13.10	126	<2	540		<0.2	9.10	272	<0.09		82.3	27.20	0.00120	0.055	0.00008	20.4	0.605		37.8	<0.001	0.0007	0.079	<0.00001	<0.00005	<0.0001	0.00090	0.000068	<0.0005	10.4			
6/23/2015	236.56	7.05	726	-115.1	15.40	130	<2	512		0.10	9.00	269	<0.09		80.2	26.20	0.00240	0.073	0.00033	21.0	0.571		35.0	0.0014	0.0009	0.079	<0.00001	<0.00005	<0.0001	0.00127	0.000020	<0.0005	10.4			
7/7/2015	236.29	7.05	733	-120.5	15.70	118	<2	531		0.10	8.90	264	<0.09		87.1	28.70	0.00120	0.071	0.00023	21.6	0.626		35.1	<0.001	0.0009	0.077	<0.00001	<0.00005	<0.0001	0.00075	0.000010	<0.0005	10.7			
7/23/2015	236.24	7.12	732	-23.9	13.20	122	<2	528		0.10	9.00	269	<0.09		85.8	27.90	0.00240	0.061	0.00019	21.2	0.610		41.1	0.0997	0.0018	0.312	0.00031	<0.00005	<0.0001	0.00090	0.002290	<0.0005	10.9			
10/12/2015	238.00	7.11	709	-106.6	13.20	121	<2	527		0.10	9.30	255	<0.09		83.7	27.20	0.00987	0.079	0.00043	20.2	0.589		34.2	<0.002	0.0010	0.091	<0.00002	<0.00005	0.00010	0.00078	0.000503	<0.0001	10.7			
3/6/2016	237.37	7.20	625	-116.8	13.00	155	<2	390	42.5	0.25	7.36	157	<0.09		55.6	17.10	0.00100	0.061	0.00004	10.1	0.374		30.0	<0.002	0.0008	0.129	<0.00002	<0.00002	<0.00005	0.00042	<0.00002	<0.0001	10.5			
5/17/2016	236.52	7.18	586	-104.7	12.50	164	<2	395	23.4	0.19	10.10	155	<0.09		57.3	18.30	0.00207	0.100	0.00012	3.81	0.520		52.9	<0.002	0.0009	0.087	<0.00002	<0.00002	<0.00005	0.00098	0.000029	<0.0001	9.6			
8/23/2016	237.90	7.21	615	-55.8	15.20	159	<0.4	378	7.5	0.22	11.00	160	<0.09		55.2	17.40	0.00500	0.073	0.00063	0.08	0.047		35.0	0.0060	0.0002	0.092	<0.00002	<0.00002	0.00007	0.00077	0.000217	<0.0002	12.1			
12/6/2016	238.53	7.27	600	-42.4	11.50	158	<0.4	332	21.7	0.18	8.12	119	<0.09		52.6	16.20	0.00282	0.115	0.00023	0.12	0.097		32.0	<0.002	0.0001	0.119	<0.000005	<0.000004	0.00010	0.00076	0.000010	<0.00003	11.8			
2/21/2017	238.06	7.42	467	-49.0	12.70	165	0.20	290	10.9	0.19	7.68	78.5	0.10		39.7	11.40	0.00080	0.113	0.00015	1.13	0.153		57.4	0.0002	0.00134	0.142	0.000025	0.00002	0.00004	0.00129	0.000008	0.000015	12.0			
6/13/2017	237.07	7.25	465	-17.0	13.90	175	2.50	309	2.5	0.22	12.40	86.1	0.045		41.1	12.20	0.00040	0.119	0.00034	0.18	0.044		39.5	0.0007	0.00041	0.173	0.000020	0.000025	0.000087	0.00068	0.000007	0.000015	12.1			
9/12/2017	237.55	7.57	440	-35.8	13.70	156	<0.1	256	0.3	0.20	5.29	51.7	<0.09		32.8	10.10	0.00288	0.189	0.00015	0.98	0.075		55.2	0.0022	0.00119	0.219	<0.000004	<0.0001	0.000066	0.00039	0.000032	<0.00003	11.0			
11/7/2017	238.15	7.39	360	-110.9	12.40	155	< 5	225	7.5	0.17	4.19	34.9	< 0.09		36.0	10.20	0.00100	0.112	0.00008	2.18	0.134		28.6	0.0006	0.00087	0.374	< 0.000004	< 0.000005	0.000099	0.00015	0.000032	< 0.00003	11.5			
2/7/2018	237.54	7.90	331		11.70	176	< 5	227	63	0.20	6.57	37.6	< 0.09		31.2	9.23	0.00999	0.116	0.00019	0.82	0.0604		43.0	0.0009	0.00117	0.290	< 0.000004	0.00051	0.000138	0.00092	0.000032	< 0.00003	11.8			
5/2/2018	235.62	7.65	337	-88.4	13.30	172	< 5	208	11.5	0.21	5.28	27.8	< 0.002	1.72	34.8	9.73	0.00235	0.086	0.00014	1.39	0.131	0.00156	25.5	0.0010	0.00077	0.367	< 0.000004	0.000006	0.000077	0.00014	0.000032	0.00003	12.8		0.261	0.00001
7/11/2018	236.40	8.14	325	-119.7	14.00	168	< 5	197	5.8	0.20	3.97	22.0	< 0.002	1.67	33.3	8.93	0.0010	0.157	0.00009	0.93	0.128	0.00135	23.7	0.0007	0.00058	0.386	< 0.000004	< 0.000005	0.000135	0.00023	0.00001	< 0.00003	12.2		0.246	< 0.00001
10/17/2018	236.40	7.79	325	-121.9	12.70	183	< 8	194	5.0	0.19	3.59	17.7	< 0.002	1.67	33.4	9.1	0.0052	0.122	0.00010	1.32	0.124	0.001	23.0	0.0009	0.0007	0.417	< 0.00002	0.00001	0.00008	0.00017	< 0.00002	< 0.00003	12.0		0.251	< 0.0001
2/13/2019	234.90	8.20	317	-100.7	11.20	167	< 8	80	5.6	0.18	3.48	14.3	< 0.002	< 0.2	0.05	< 0.01	< 0.001	< 0.02	0.00016	< 0.003	0.0003	0.001	< 0.06	< 0.0007	0.00059	0.374	< 0.00002	< 0.00001	< 0.00004	0.00019	< 0.00002	< 0.00003	12.2		0.004	< 0.0001
5/15/2019	236.50	8.49	311	-118.5	12.80	177	< 8	192	8.9	0.20	3.84	13.7	< 0.002	1.56	34.0	8.77	0.0020	0.08	0.00003	0.73	0.113	0.001	23.2	< 0.0007	0.00059	0.414	< 0.00002	< 0.00001	0.00010	0.00014	< 0.00002	< 0.00003	12.7		0.253	< 0.0001
8/21/2019	236.00	7.10	312	-129.3	14.80	163	< 8	197	8.9	0.17	3.45	11.7	< 0.002	1.52	32.3	8.89	0.0500	< 0.1	< 0.001	1.01	0.110	< 0.002	24.1	0.0040	0.00068	0.453	< 0.0001	< 0.00005	< 0.0002	< 0.0005	< 0.0002	< 0.0002	11.5		0.255	< 0.0005
11/20/2019	237.60	7.30	326	-127	11.70	180	< 8	184	8.9	0.18	3.91	12.9	< 0.002		32.1	8.67	< 0.005	0.071	< 0.0002	1.16	0.118		22.0	< 0.0007	0.00068	0.456	< 0.00002	< 0.00001	0.000275	0.00020	< 0.00005	< 0.00003	11.4			
2/19/2020	237.75	7.77	264	-127	12.30	174	< 8	202	4.8	0.180	2.77	9.3	< 0.002		32.5	8.8	0.0080	0.064	< 0.0002	1.11	0.103		20.7	< 0.0007	0.00058	0.462	< 0.00002	< 0.00001	0.00010	0.00010	< 0.00005	< 0.00003	12.3			
4/29/2020	235.00	7.90	265	-66	12.90	156	< 8	193	2.70	0.20	4.66	9.4	< 0.002		30.5	8.45	< 0.005	0.057	< 0.0002	0.39	0.0936		24.5	0.0020	0.00055	0.421	< 0.00002	< 0.00001	0.00006	0.0001	< 0.00005	< 0.00003	11.7			
CIP took over sampling																																				
9/24/2020	237.40	7.54	308	-146.8	13.48	149	-137	163	11.0	0.15	2.39	10.0	<0.2		32.1	8.9	<0.05	0.0584	<0.002	0.79	0.17		21.3	0.0200	<0.005	0.449	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	5.4			
11/23/2020		7.32	346	-63	9.50	150	-129	180	7.0	0.19	3.40	12.0	<0.2		32.0	8.7	<0.05	0.058	<0.002	0.94	0.14		21.0	<0.02	0.0009	0.43	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	12.0			
1/12/2021	239.49	7.29	337	-40	9.75	160	-144	150	<2.2	0.18	2.50	9.90	<0.13		33	9.1	<0.034	0.07	<0.0017	0.82	0.13		21	<0.015	0.00093	0.45	0.00058	<0.00020	<0.00098	<0.0015	<0.00045	<0.00089	13.0			
4/7/2021	237.73	6.98	311	-29	13.82	160	-112	190	3.00	0.21	4.80	11.00	<0.13	1.9	31	8.5	<0.047	0.083	<0.0035	0.55	0.12	<0.0049	28	<0.0097	0.00078	0.41	<0.00060	<0.00020	<0.00063	<0.0022	<0.0028	<0.0060	13.0	6.0	0.25	<0.0027
9/21/2021	238.73	7.67	266	-9	16.31	160	-165	160	9.00	0.18	1.40	8.50	<0.13	1.5	33	8.7	0.06	<0.057	0.0017	0.73	0.13	0.0018	18	<0.015	<0.00075	0.52	<0.00062	<0.00020	<0.0025	<0.0015	0.0098	<0.00089	13.0	5.9	0.28	<0.00020
11/5/2021	239.02	7.95	242	-18	9.48	150	-130	160	<1.0	0.17	1.70	6.90	<0.13	1.5	31	8.5	<0.034	<0.057	<0.0017	1.5	0.11	0.0015	19	<0.015	<0.00075	0.51	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	11.0	5.0	0.28	<0.00020
3/16/2022	N/A	7.62	277	95	17.62	150	-119	170	120	0.15	3.90	7.50	<0.13	1.8	31	8.7	<0.016	0.068	0.0033	0.21	0.12	0.0017	23	0.012	0.00064	0.52	<0.00027	0.00026	<0.0015	0.00097	0.0002	<0.00074	13.0	6.2	0.27	<0.00047
4/13/2022	237.44	7.42	285	104	13.01	150	-114	140	6.20	0.17	1.50	5.90	<0.13	1.4	32	8.5	<0.016	0.05	<0.0011	0.48	0.09	0.001	20	<0.0029	0.00054	0.49	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	12.0	5.8	0.29	<0.00047
8/18/2022	256.85	7.08	274	163	14.87	180	-100	180	8.90	0.16	1.30	5.20	<0.13	1.4	31	8.1	<0.034	<0.057	0.0018	0.38	0.1	0.0011	18	<0.015	<0.00075	0.51	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	12.0	5.5	0.27	<0.00020
10/31/2022	N/A	7.94	275	51	13.93	150	-59	150	9.40	0.15	1.40	4.60	<0.13	1.5	32	8.5	<0.034	<0.057	<0.0017	<0.047	0.1	0.0011	18	<0.015	<0.00075	0.46	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	12.0	5.6	0.26	<0.00020
3/21/2023	237.10	6.80	296	-102	12.00	150	-112	160	4.20	0.09	1.20	3.80	<0.13	1.5	32	8.6	<0.034	<0.057	<0.0017	0.06	0.09	<0.0011	19	<0.015	<0.00075	0.49	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	13.0	5.9	0.26	<0.00020
5/15/2023	236.94	7.88	323	-37	14.19	150	11	160	3.30	0.16	1.50	2.90	<0.13	1.4	31	8.6	<0.034	<0.057	<0.0017	0.85	0.09	<0.0011	17	<0.015	<0.00075	0.49	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	10.0	4.9	0.25	<0.00020
8/31/2023	235.01	6.65	301	121	12.75	150	-303	160	3.20	0.12	1.60	4.10	<0.13	1.4	29	7.9	<0.034	0.057	<0.0017	0.94	0.095	<0.0011	19	<0.015	<0.00075	0.46	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	12.0	5.7	0.23	<0.00020
11/15/2023	236.52	7.66	304	88	13.24	150	-172	160	5.70	0.13	2.40	6.30	<0.13	1.4	30	8.2	<0.034	<0.057	<0.0017	0.87	0.11	<0.0011	19	<0.015	<0.00075	0.45	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	12.0	5.7	0.23	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																				
6/10/2024	N/A	7.09	284	-5	17.22	150	-188	150	5.00	0.13	0.87	2.80	<0.13	1.8	35	9.3	<0.034	<0.057	0.0030	<0.047	0.044	<0.0011	16	<0.015	<0.00075	0.51	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	14.0	6.4	0.31	<0.00020

MW-1405

SAMPLING DATE	Depth to SWL (Field Measurements) ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	41	41	41	41	41	41	41	41	33	41	41	41	41	18	41	41	41	41	41	41	41	18	41	41	41	41	41	41	41	41	41	41	41	12	18	18
Average of detected	213.45	7.56	1942	-69.5	12.4	218	-116	1471	11.8	0.39	57.5	787	0.045	5.2	44.4	14.7	0.0162	0.432	0.00242	2.28	0.334	0.00162	385	0.0067	0.0006	0.017	0.00005	0.00028	0.0002	0.00070	0.00041	0.0001	14.3	7.8	0.91	0.00151
Std.Dev. Of detected	4.29	0.41	618	66.5	2.1	60	81	632	14.8	0.13	29.1	299	0.000	2.0	23.7	7.5	0.0323	0.051	0.01014	1.18	0.213	0.00054	125	0.0140	0.0005	0.006	0.00010	0.00070	0.0003	0.00135	0.00089	0.0000	3.0	1.1	0.63	0.00260
Maximum of Detected	217.91	9.06	3035	146.0	17.5	385	6	3900	63.0	0.74	120.0	1180	0.045	8.2	88.4	27.5	0.1500	0.619	0.05100	6.50	0.767	0.00260	752	0.0520	0.0018	0.040	0.00034	0.00200	0.0014	0.00690	0.00330	0.0002	21.0	10.0	1.85	0.00540
Median of Detected	214.45	7.48	1857	-85.0	11.8	212	-126	1530	7.2	0.37	57.5	857	0.045	4.9	46.5	16.2	0.0037	0.428	0.00021	2.31	0.303	0.00170	405	0.0008	0.0004	0.016	0.00002	0.00002	0.0001	0.00030	0.00004	0.0001	14.4	7.9	0.62	0.00032
Minimum of Detected	192.52	6.21	835	-147.0	9.9	130	-253	540	0.4	0.19	19.0	250	0.045	3.0	9.2	3.1	0.0010	0.346	0.00003	0.29	0.048	0.00076	180	0.0004	0.0002	0.010	0.00001	0.00001	0.0001	0.00016	0.00001	0.0001	3.2	6.1	0.29	0.00001
% of Detected	90	100	100	12	100	100	10	100	100	100	100	100	5	100	100	100	63	100	61	98	98	67	100	49	66	100	24	20	59	66	49	44	100	100	100	22
DL							<2						<0.09															<0.00005	<0.0001			<0.0005				
3/25/2015																																				
4/13/2015																																				
4/28/2015																																				
5/11/2015																																				
5/26/2015																																				
6/9/2015	214.45	7.43	1661	-114	12.0	192	<2	1270		0.74	40.0	739	<0.09		39.8	16.2	0.0030	0.354	0.00012	2.62	0.427		303	0.0009	0.0016	0.026	<0.00001	<0.00005	0.0001	0.00087	0.00006	<0.0005	13.0			
6/23/2015	213.55	7.43	1637	-117	12.2	190	<2	1260		0.68	35.3	692	<0.09		53.4	18.2	0.0064	0.415	0.00037	2.48	0.500		277	0.0007	0.0011	0.024	<0.00001	<0.00005	0.0001	0.00028	0.00004	<0.0005	14.8			
7/7/2015	213.60	7.48	1724	-122	11.7	213	<2	1320		0.57	39.3	766	<0.09		58.1	20.0	0.0022	0.424	0.00024	2.84	0.563		288	0.0004	0.0009	0.025	<0.00001	<0.00005	<0.0001	0.00028	0.00001	<0.0005	14.7			
7/21/2015	213.92	7.45	1844	-122	12.1	230	<2	1530		0.50	42.9	798	<0.09		62.8	22.1	0.0037	0.418	0.00021	3.12	0.624		411	0.0006	0.0015	0.026	0.00003	<0.00005	<0.0001	0.00038	0.00003	<0.0005	14.3			
9/29/2015	215.39	7.41	1868	-147	11.8	265	<2	1640		0.58	50.8	862	<0.09		73.5	24.0	0.0014	0.460	0.00008	4.03	0.672		432	0.0008	0.0014	0.022	<0.00001	<0.00005	0.0002	0.00021	0.00002	0.0001	15.9			
10/12/2015	215.55	7.53	1895	-133	12.1	251	<2	1550		0.45	46.3	775	<0.09		62.7	21.0	0.0038	0.453	0.00030	3.23	0.608		405	0.0009	0.0011	0.020	0.00001	<0.00005	0.0001	0.0002	0.00062	0.0001	14.2			
10/26/2015	216.00	7.54	1745	-106	11.6	213	<2	1360		0.47	37.8	740	<0.09		56.2	19.8	0.0024	0.446	0.00007	2.69	0.565		404	<0.002	0.0009	0.019	0.00005	<0.00005	<0.0001	0.0002	0.00238	0.0001	15.0			
11/16/2015	216.18	7.93	1784	-102	12.1	250	<2	1440		0.70	43.6	766	<0.09		46.5	16.5	0.0061	0.428	0.00021	2.33	0.498		411	<0.002	0.0007	0.018	<0.00001	<0.00005	0.0001	0.0002	0.00003	<0.0001	13.2			
3/6/2016	215.95	7.37	1646	-56	11.2	199	<2	1150	9	0.42	27.1	609	<0.09		33.5	10.6	0.0025	0.375	0.00006	1.83	0.312		318	0.0004	0.0007	0.018	<0.00002	<0.00002	0.0001	0.00016	<0.00002	<0.0001	13.2			
5/17/2016	214.45	7.23	1857	-84	11.0	186	<2	1110	0.8	0.44	25.8	617	<0.09		39.2	12.9	0.0020	0.393	0.00011	1.63	0.308		382	0.0005	0.00053	0.018	<0.00002	<0.00002	0.0001	0.0002	0.00002	<0.0001	12.9			
8/23/2016	216.75	7.29	2124	-81	15.1	268	<0.4	1640	6	0.34	45.8	887	<0.09		54.1	16.9	0.0030	0.428	0.00073	1.60	0.250		356	0.0370	0.00043	0.019	<0.00002	0.00012	0.0002	0.0004	0.00009	0.0002	16.5			
12/6/2016	217.91	7.43	2505	-80	10.7	255	<0.4	2110	7.2	0.34	99.1	1150	<0.09		78.6	24.9	0.0038	0.435	0.00015	2.93	0.583		520	0.0032	0.00047	0.018	<0.00005	0.00001	0.0002	0.00074	0.00001	0.0001	15.3			
2/21/2017	216.46	7.51	2774	-68	11.5	272	0.20	2040	4.5	0.41	93.5	1080	0.05		74.1	22.3	0.0010	0.372	0.00043	2.42	0.482		444	0.0112	0.00034	0.038	0.000045	0.000009	0.000242	0.00088	0.0011	0.00008	13.2			
6/13/2017	215.15	7.36	2899	-104	13.2	311	2.50	2040	9.5	0.24	69.9	1150	0.05		88.4	27.1	0.0040	0.468	0.00019	3.43	0.767		470	0.0004	0.00032	0.015	0.000004	0.000005	0.000199	0.00053	0.00001	0.00008	16.4			
9/12/2017	216.09	7.60	3035	-2	12.6	283	<0.1	2020	42.2	0.32	71.5	1180	<0.09		86.5	27.5	0.0132	0.549	0.00029	3.36	0.482		543	0.0008	0.00039	0.013	0.000008	<0.0001	0.000112	0.00051	0.000063	0.00008	13.8			
11/7/2017	216.48	7.47	2839	-91	10.8	256	< 5	1990	8.6	0.32	75.8	1170	< 0.09		70.7	24.0	0.0010	0.460	0.00009	2.86	0.704		562	< 0.0004	0.00025	0.012	0.000005	< 0.000005	0.000143	0.0003	0.000008	0.00009	13.7			
2/7/2018	215.96	7.82	2906	-83	10.5	317	< 5	2080	21.4	0.29	86.9	1140	< 0.09		85.4	26.4	0.0670	0.489	0.00059	4.13	0.627		488	0.001	0.00042	0.020	0.00001	0.00003	0.000345	0.00060	0.000168	0.00009	3.22			
5/2/2018	209.94	7.48	2600	-87	12.4	288	< 5	2050	14.0	0.45	94.5	1180	< 0.002	8.02	56.1	19.1	0.0020	0.443	0.00015	2.82	0.479	0.00157	494	0.0006	0.00022	0.011	< 0.000004	0.000008	0.000096	0.0002	0.00004	0.00008	14.4		1.45	< 0.00001
7/11/2018	213.40	7.66	2520	-117	11.7	311	< 5	1830	8.7	0.35	68.9	1020	< 0.002	8.15	55.9	16.7	0.00221	0.619	0.00009	3.08	0.437	0.00115	440	0.0005	0.00029	0.015	0.000005	< 0.000005	0.000160	0.00023	0.00001	0.0001	14.7		1.80	0.00001
10/17/2018	213.50	7.75	2630	-43	11.3	300	< 8	2000	5.8	0.41	80.1	1000	< 0.002	8.00	64.8	20.2	0.0070	0.540	0.0002	2.79	0.454	0.001	470	< 0.001	0.00028	0.015	< 0.00004	< 0.00002	0.0003	0.00032	< 0.00004	0.0001	13.9		1.85	< 0.0002
2/13/2019	206.67	8.10	2620	-118	10.0	251	< 8	3900	10.2	0.42	83.1	1110	< 0.002	7.50	57.4	18.8	0.0266	0.410	0.00062	3.00	0.376	0.002	752	0.0008	0.00028	0.013	< 0.00002	0.00002	0.0002	0.00045	0.000108	0.00005	13.5		1.66	< 0.0001
5/15/2019	211.80	8.08	2470	-127	11.2	385	< 8	1780	4.9	0.35	70.6	874	< 0.002	7.28	58.8	18.0	0.0010	0.448	0.00003	2.73	0.364	0.001	435	< 0.0007	0.00029	0.017	< 0.00002	< 0.00001	0.0001	0.00028	< 0.00002	0.00006	16.1		1.72	< 0.00002
8/21/2019	213.10	7.50	2460	-103.6	15.1	219	< 8	1960	2.7	0.44	87.9	1080	< 0.002	7.23	49.4	16.7	0.0300	0.423	< 0.001	2.29	0.298	0.002	482	< 0.004	0.00030	0.016	< 0.0001	< 0.00005	0.0002	< 0.0005	< 0.0002	0.0002	11.4		1.46	< 0.0005
11/20/2019	214.00	7.50	2400	-103	10.8	229	< 8	1720	5.1	0.40	76.8	896	< 0.002		38.0	12.7	< 0.005	0.402	< 0.0002	1.79	0.255		396	< 0.0007	0.00022	0.013	< 0.00002	< 0.00001	0.0001	0.0003	< 0.00005	0.00005	12.1			
2/19/2020	212.90	7.82	1710	-123	10.6	212	< 8	1530	10.0	0.44	62.2	857	< 0.002		30.1	10.2	< 0.005	0.371	< 0.0002	1.65	0.194		389	< 0.0007	0.00023	0.014	< 0.00002	< 0.00001	0.0001	0.0002	< 0.00005	< 0.00003	13.5			
4/29/2020	209.08	8.21	1661	-127	11.4	197	< 8	1580	1.0	0.55	63.7	858	< 0.002		25.3	8.8	< 0.005	0.346	< 0.0002	1.44	0.153		388	0.0009	0.00022	0.016	< 0.00002	< 0.00001	0.0001	0.0002	< 0.00005	0.00007	11.7			
CIP took over sampling																																				
9/23/2020	214.25	7.35	1755	54	12.55	176	-176	1220	9	0.47	57.5	937	<0.2		22.5	7.7	<0.05	0.453	<0.002	0.46	0.111		473	0.020	<0.005	0.011	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	5.8			
12/9/2020	216.55	6.99	1540	-43	9.94	170	-193	1400	8	0.35	77.0	790	<0.2		35.0	12.0	<0.05	0.440	<0.002	1.70	0.170		410	<0.02	<0.005	0.015	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	13.0			
1/11/2021		7.47	2430	-33	9.95	130	-120	1600	5	0.26	120.0	990	<0.13		49	16	<0.034	0.4	<0.0017	2.2	0.210		500	<0.015	<0.00075	0.015	0.00034	<0.00020	<0.00098	<0.0015	<0.00045	<0.0089	12.0			
4/7/2021	215.20	7.36	2380	-85	17.54	170	-144	1600	7	0.32	99.0	990	<0.13	5.6	39	14	0.0610	0.44	<0.0035	1.5	0.180	<0.0049	410	<0.0097	<0.0041	0.017	<0.00060	<0.00020	<0.00063	0.003	<0.0028	<0.0060	15.0	6.1	1.2	0.0054
9/2/2021	215.42	7.88	2030	-75	17.46	150	5.9	1600	7	0.31	110.0	1000	<0.13	6.0	43	15	<0.034	0.41	<0.0017	2	0.220	<0.0011	470	<0.015	<0.00075	0.013	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	14.0	6.5	1.4	<0.00020
11/8/2021	214.51	9.06	1860	-71	12.78	140	-99.9	1300	4	0.37	80.0	810	<0.13	5.2	25	9	<0.034	0.43	<0.0017	1.1	0.160	0.0019	390	<0.015	<0.00075	0.010	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	15.0	7.1	0.8	0.00041
3/17/2022	N/A	7.47	1170	-85	11.41	150	-94.7	750	15	0.19	27.0	400	<0.13	3.8	16	5	0.0160	0.46	<0.0011	1.6	0.093	0.00076	240	<0.0029	<0.00028	0.013	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	19.0	8.7	0.44	<0.00047
4/26/2022	213.88	7.54	1160	-20	10.92	140	-90	640	63	0.25	21.0	360	<0.13	3.7	14	4.9	<0.034	0.38	<0.0017	1.7	0.096	<0.0011	210	<0.015	<0.00075	0.013	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	17.0	7.9	0.39	<0.00020
8/17/2022	192.52	7.47	1460	88	16.81	160	-126	660	20	0.28	21	340	<0.13	3.4	13	4.5	<0.034	0.43	0.0021	0.38	0.085	<0.0011	210	<0.015	<0.00075	0.012	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	16	7.6	0.36	<0.00020
10/31/2022	N/A	7.84	1030	146	17.11	170	-152	690	12	0.48	23	340	<0.13	3.4	12	4.1	<0.034	0.42	<0.0017	<0.047	0.048	0.0026	230	<0.015	<0.00075	0.013	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	15	7	0.34	<0.00020
3/21/2023	210.21	7.00	976	-109	10.40	150	-128	590	6.6	0.19	20.0	270	<0.13	3.2	9.2	3.1	<0.034	0.39	<0.0017	0.58	0.066	<0.0011	200	<0.015	<0.00075	0.014	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	17.0	7.9	0.29	<0.00020
5/15/2023	210.14	7.99	1110	-133	14.77	150	5.4	620	2.2	0.27	19.0	280	<0.13	3.3	11	3.9	<0.034	0.43	<0.0017	1.40	0.063	<0.0011	200	<0.015	<0.00075	0.017	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	17.0	7.8	0.32	<0.00020
8/29/2023	215.45	6.21	1020	33	13.28	180	-253	590	0.4	0.29	20.0	260	<0.13	3.0	9.4	3.2	<0.034	0.44	0.00200	0.29	0.059	0.00180	190	<0.015	<0.00075	0.015	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	18.0	8.4	0.29	0.00022
11/15/2023	211.15	7.67	1040	-31	12.25	180	-196	600	0.4	0.30	22.0	270	<0.13	3.1	11	3.6	<0.034	0.41	<0.0017	0.73	0.054	0.00200	200	<0.015	<0.00075	0.018	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	18.0	8.4	0.30	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																				
6/10/2024	N/A	7.47	835	76	15.72	170	-217	540	58	0.19	20.0	250	<0.13	4.6	14	4.1	0.1500	0.42	0.05100	6.50	0.260	0.00160	180	0.052	0.00180	0.040	<0.00062	0.00200	0.0014	0.0069	0.00330	<0.00089	21.0	10.0	0.35	<0.00020

Record of Duplicates

Date	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
10/26/2015	215	<2	1360		0.46	37.8	729	<0.2		56.0	19.6	0.00232	0.444	0.00005	2.7	0.56		398	<0.002	0.0009	0.019	0.00005	<0.00005	0.0001	0.0002	0.000013	0.0001	14.8			
10/26/2015 duplicate	211	<2	1360		0.47	37.8	750	<0.2		56.4	19.9	0.00254	0.447	0.00008	2.7	0.569		409	<0.002	0.0009	0.019	0.00005	<0.00005	0.00007	<0.0002	0.00475	0.0001	15.2			
1/11/2021	130	-120	1.6	5	0.26	120.0	990	<0.13		49	16	<0.034	0.4	<0.0017	2.2	0.210		500	<0.015	<0.00075	0.015	0.00034	<0.00020	<0.00098	<0.0015	<0.00045	<0.0089	12.0			
1/11/2021 Duplicate	130	-131	1.50	<2.2	0.26	120.0	1000	<0.13		51	17	<0.034	0.43	<0.0017	2.30	0.22		520.0	<0.015	<0.00075	0.015	<0.00031	<0.00020	<0.00098	<0.0015	<0.00045	<0.0089	15			
9/2/2021	150	5.9	1600	7	0.31	110.0	1000	<0.13	6.0	43	15	<0.034	0.41	<0.0017	2	0.220	<0.0011	470	<0.015	<0.00075	0.013	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	14.0	6.5	1.4	<0.00020
9/2/2021 Duplicate	150	5.30	1600	3	0.34	110.0	1000	<0.13	6.2	44	15	<0.034	0.39	<0.0017	2	0.23	<0.0011	480	<0.015	<0.00075	0.014	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	15	6.8	1.4	<0.00020
3/17/2022	150	-94.7	750	15	0.19	27.0	400	<0.13	3.8	16	5	0.0160	0.46	<0.0011	1.6	0.093	0.00076	240	<0.0029	<0.00028	0.013	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	19.0	8.7	0.44	<0.00047
3/17/2022 Duplicate	140	-96.3	770	15	0.24	27	390	<0.13	3.9	16	5.1	0.017	0.45	<0.0011	1.6	0.095	0.00083	250	<0.0029	<0.00028	0.014	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	18	8.3	0.45	<0.00047

MW-1406

SAMPLING DATE	Field Measurements: Depth to SWL ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	39	40	40	40	40	40	40	40	32	40	40	40	40	17	40	40	40	40	40	40	40	17	40	40	40	40	40	40	40	40	40	40	40	11	17	17
Average of detected	274.61	8.37	1315	-74.3	13.6	444	-271.6	957	190.3	1.60	34.0	238	0.073	2.52	4.46	1.24	0.622	0.310	0.00138	0.558	0.024	0.00739	315	0.007	0.0016	0.039	0.00013	0.00005	0.0014	0.00157	0.00196	0.0002	23.2	11.4	0.094	0.00177
Std.Dev. Of detected	2.94	0.58	453	122.2	4.0	90	161.0	307	514.5	0.50	12.6	147	0.039	1.07	2.75	0.54	2.725	0.058	0.00320	2.455	0.029	0.00200	101	0.013	0.0008	0.020	0.00037	0.00011	0.0052	0.00347	0.00630	0.0003	8.7	6.1	0.040	0.00225
Maximum of Detected	278.10	9.07	2070	164.2	26.1	581	9.9	1570	2600.0	2.76	53.0	546	0.100	5.30	17.00	3.40	15.000	0.465	0.01300	14.000	0.160	0.01200	632	0.052	0.0058	0.094	0.00130	0.00028	0.0260	0.02000	0.02890	0.0014	63.0	29.0	0.156	0.00430
Median of Detected	275.01	8.48	1275	-89.0	12.1	452	-264.0	883	21.3	1.56	36.0	193	0.073	2.60	3.81	1.11	0.046	0.304	0.00024	0.098	0.016	0.00770	310	0.001	0.0015	0.042	0.00002	0.00001	0.0003	0.00052	0.00008	0.0002	22.0	10.0	0.098	0.00099
Minimum of Detected	258.24	6.30	563	-478.0	6.1	230	-477.0	493	1.5	0.81	12.0	11	0.045	1.10	1.70	0.41	0.005	0.220	0.00008	0.025	0.004	0.00460	157	0.000	0.0009	0.005	0.00000	0.00000	0.0001	0.00020	0.00002	0.0001	9.2	6.9	0.023	0.00001
% of Detected	92	100	100	20	100	100	8	100	91	100	100	100	5	100	100	100	75	100	65	80	98	94	100	43	88	100	30	15	60	83	58	53	100	100	100	18
DL							<2						<0.09															<0.00005	<0.0001			<0.0005				
3/25/2015																																				
4/13/2015																																				
4/28/2015																																				
5/11/2015																																				
5/26/2015																																				
6/9/2015	274.49	8.98	652	-202.2	11.6	360	<2	512		2.74	12.2	14	<0.09		2.58	1.04	0.175	0.234	0.00010	0.115	0.009		180	0.001	0.0009	0.042	0.00002	<0.00005	0.0003	0.00028	0.00023	<0.0005	41.4			
6/23/2015	274.20	8.92	679	-190.3	11.9	381	<2	493		2.76	12.0	11	<0.09		2.94	1.25	0.650	0.249	0.00049	0.220	0.009		170	0.001	0.0009	0.050	0.00005	<0.00005	<0.0001	0.00048	0.02890	<0.0005	30.5			
7/7/2015	274.13	8.94	665	-162.9	14.9	361	<2	568		2.57	12.3	26	<0.09		2.48	0.92	0.505	0.250	0.00063	0.309	0.017		157	0.002	0.0024	0.036	0.00004	<0.00005	0.0008	0.00100	0.00059	<0.0005	38.9			
7/21/2015	274.20	8.93	698	-154.5	13.2	347	<2	1450		2.07	14.2	45	<0.09		2.41	0.83	0.049	0.238	0.00033	0.062	0.012		204	0.001	0.0021	0.036	0.00004	<0.00005	0.0001	0.00053	0.00009	<0.0005	31.8			
9/29/2015	274.91	8.78	886	-181.7	12.5	375	<2	613		2.26	19.1	77	<0.09		2.77	0.98	0.028	0.260	0.00018	0.056	0.013		232	<0.002	0.0017	0.044	<0.00001	<0.00005	0.0001	0.00028	0.00195	<0.0005	24.0			
10/12/2015	275.02	8.75	823	-191.8	12.7	358	<2	583		1.93	18.2	72	<0.09		3.01	0.98	0.006	0.264	0.00023	0.058	0.015		231	<0.002	0.0017	0.044	<0.00001	<0.00005	<0.0001	0.00028	0.00020	<0.0005	21.6			
10/29/2015	275.24	8.82	865	-179.6	11.7	374	<2	612		2.09	19.9	83	<0.09		3.05	1.11	0.159	0.280	0.00038	0.103	0.016		248	<0.002	0.0017	0.061	0.00002	<0.00005	0.0003	0.00046	0.00052	0.0002	21.2			
11/16/2015	275.00	8.88	850	-126.6	12.1	415	<2	656		2.21	22.7	98	<0.09		2.68	0.97	0.059	0.260	0.00022	0.055	0.013		232	<0.002	0.0015	0.043	<0.00001	<0.00005	0.0002	0.00052	0.00007	0.0002	19.9			
3/9/2016	274.65	8.54	1043	-150.9	11.5	436	<2	737	21	2.06	26.3	136	<0.09		3.06	1.13	0.042	0.267	0.00010	0.047	0.015		317	0.001	0.0015	0.058	<0.00002	<0.00002	<0.00005	0.00031	0.00008	0.0003	15.2			
5/17/2016	274.26	8.29	1217	-115.8	11.8	485	<2	857	13	2.04	32.7	186	<0.09		3.05	0.99	0.083	0.241	0.00020	0.055	0.013		252	<0.002	0.0012	0.049	<0.00002	0.00002	0.0002	0.00034	0.00007	0.0002	17.1			
8/23/2016	274.92	8.03	1419	-478.0	15.1	453	<0.4	822	2.7	1.89	31.3	195	<0.09		3.10	1.08	0.022	0.250	0.00083	0.062	0.007		246	0.016	0.0014	0.070	<0.00002	<0.00002	0.0001	0.00100	0.000348	0.0002	20.1			
12/6/2016	275.65	7.97	1515	-44.5	10.8	483	<0.4	965	3.2	1.72	39.2	243	<0.09		3.91	1.38	0.005	0.326	0.00049	0.025	0.010		331	<0.002	0.0015	0.063	<0.00005	0.00001	0.0001	0.00113	0.000028	0.0002	21.8			
2/21/2017	275.25	8.18	1548	-82.6	11.9	566	0.20	1140	10.9	1.73	46.4	293	0.10		4.32	1.40	0.072	0.280	0.00018	0.103	0.024		315	0.0002	0.0015	0.063	0.00001	0.0000020	0.000321	0.00122	0.000073	0.0002	23.0			
6/13/2017	274.88	8.36	1539	-11.9	18.2	581	2.50	1240	22.7	1.77	48.6	342	0.045		4.19	1.45	0.024	0.302	0.00027	0.102	0.026		337	0.0002	0.0013	0.056	0.00000	0.0000025	0.00047	0.00113	0.000044	0.0002	24.0			
9/12/2017	275.63	8.42	1735	-83.0	13.2	554	<0.1	1250	55.8	1.60	49.4	358	<0.09		5.00	1.74	1.070	0.465	0.00073	0.590	0.030		380	0.0043	0.0017	0.068	0.00004	<0.0001	0.00134	0.00141	0.000662	0.0003	23.3			
11/7/2017	275.68	8.48	1770	-126.3	11.1	556	< 5	1220	42.1	1.66	49.6	367	< 0.09		4.69	1.60	0.024	0.367	0.00010	0.075	0.023		417	0.0006	0.0014	0.059	0.0000060	< 0.000005	0.000178	0.00049	0.000039	0.0002	22.7			
2/7/2018	275.29	8.55	1769	-123.6	10.3	559	< 5	1260	50.6	1.64	49.9	396	< 0.09		5.15	1.69	0.029	0.342	0.00018	0.091	0.022		391	< 0.0004	0.0016	0.056	0.0000060	< 0.000005	0.000252	0.00039	0.000042	0.0002	22.9			
5/2/2018	274.7	8.45	1870	-107.7	12.1	529	< 5	1130	39.2	1.66	44.5	374	< 0.002	3.43	5.39	1.74	0.017	0.389	0.00076	0.119	0.022	0.00857	408	0.0038	0.0016	0.052	< 0.000004	0.00001	0.000424	0.00035	0.000062	0.0002	23.0		0.129	< 0.00001
7/11/2018	275.3	8.64	1770	-154.3	12.0	527	< 5	1290	11.4	1.57	47.7	428	< 0.002	3.55	4.47	0.60	0.014	0.459	0.00009	0.091	0.021	0.00696	374	< 0.0004	0.0012	0.044	0.000007	< 0.000005	0.000206	0.00021	0.000022	0.0001	22.8		0.116	0.00001
10/17/2018	275.22	8.37	1950	-67.1	11.3	472	< 8	1010	2.3	1.43	37.8	314	< 0.002	3.20	5.06	1.59	0.027	0.380	0.00020	0.101	0.016	0.00972	424	0.0010	0.0014	0.047	< 0.00002	< 0.00001	0.000323	0.00043	0.00002	0.0002	19.3		0.129	< 0.0001
2/13/2019	274.33	8.51	1810	-58.2	6.1	484	< 8	1110	< 0.5	1.52	40.8	359	< 0.002	3.01	5.14	1.60	0.009	0.304	0.00025	0.064	0.012	0.00817	632	< 0.0007	0.0011	0.039	< 0.00002	< 0.00001	0.000229	0.00048	0.00002	0.0002	19.6		0.127	< 0.0001
5/15/2019	274.67	8.64	2070	-123.0	11.2	580	< 8	1540	11.2	1.54	52.9	538	< 0.002	3.21	5.46	1.73	0.009	0.315	0.00008	0.098	0.021	0.00739	431	< 0.0007	0.0011	0.043	< 0.00002	< 0.00001	0.00022	0.00025	< 0.00002	0.0001	25.3		0.147	< 0.0001
8/21/2019	275.60	8.10	1850	-121.2	13.6	573	< 8	1570	7.8	1.33	53.0	546	< 0.002	3	5.65	1.81	0.080	0.340	< 0.001	0.106	0.020	0.008	452	0.007	0.0013	0.046	< 0.0001	< 0.00005	0.0005	< 0.0005	< 0.0002	0.0002	23.0		0.156	< 0.0005
11/20/2019	275.90	7.70	2000	-67.7	11.3	497	< 8	1260	45.8	1.32	42.5	371	< 0.002		5.62	1.77	0.076	0.348	0.0002	0.230	0.017		434	0.001	0.0012	0.040	< 0.00002	< 0.00001	0.000701	0.00056	0.0001	0.0002	19.0			
2/19/2020	275.37	8.21	1760	-91	10.1	523	< 8	1310	73.7	1.46	44.4	438	< 0.002		5.55	1.70	0.010	0.304	< 0.0002	0.080	0.017		442	< 0.0007	0.0010	0.036	< 0.00002	< 0.00001	0.000438	0.0003	< 0.00005	0.0002	19.7			
4/29/2020	274.8	8.47	1750	-126.7	11.8	515	< 8	1440	10.6	1.38	47.7	467	< 0.002		5.08	1.65	0.010	0.292	< 0.0002	0.100	0.016		448	0.001	0.0011	0.035	< 0.00002	< 0.00001	0.000274	0.0002	< 0.00005	0.0001	22.3			
CIP took over sampling																																				
9/24/2020	275.89	8.31	1929	164.2	17.49	476	-477	1160	10	1.52	44.1	409	<0.2		3.61	1.10	<0.05	0.316	<0.002	<0.1	0.011		389	0.02	<0.005	0.023	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	9.2			
12/8/2020		8.19	1310	-65	9.92	400	-421	1000	<4	1.50	34.0	310	<0.2		2.90	0.88	<0.05	0.290	<0.002	<0.1	0.008		320	<0.02	<0.005	0.018	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	19.0			
1/11/2021		8.65	1220	-18	9.76	340	-242	640	<2.2	1.2	20	170	<0.13		2	0.6	<0.034	0.25	<0.0017	<0.047	0.0057		260	<0.015	<0.00075	0.012	<0.00031	<0.00020	<0.00098	<0.0015	<0.00045	<0.00089	16			
4/8/2021	275.6	8.74	983	-32	17.46	330	-255	670	9	1.2	17	130	<0.13	1.3	1.7	0.51	0.18	0.22	<0.0035	0.086	0.0035	<0.0049	200	<0.0097	<0.0041	0.01	<0.00060	<0.00020	<0.00063	0.0036	<0.0028	<0.0060	14	6.9	0.03	0.0043
9/20/2021	275.15	8.6	563	83	26.11	420	-385	910	420	1.6	28	220	<0.13	5.3	12	3.4	15	0.3	0.013	14	0.16	0.012	280	0.052	0.0058	0.094	0.0013	0.00028	0.026	0.02	0.011	0.0014	63	29	0.12	0.00099
11/8/2021	278.1	9.07	960	127	20.57	230	-217	510	2600	1.3	20	140	<0.13	1.6	17	0.94	<0.034	0.26	<0.0017	<0.047	0.0099	0.0082	210	<0.015	0.0021	0.032	<0.00062	<0.00020	<0.0025	0.0049	<0.00045	<0.00089	18	8.2	0.098	<0.00020
DNS Q1 2022 Pump Issue																																				
4/26/2022	277	6.3	620	131	12.69	260	-233	1100	140	0.84	25	130	<0.13	1.1	2.1	0.41	<0.034	0.31	<0.0017	<0.047	<0.0062	0.0088	180	<0.015	0.0021	0.009	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	22	10	0.023	<0.00020
8/17/2022	258.24	7.95	1340	136	22.85	330	-261	700	1100	0.81	35.0	190	<0.13	2.6	8.0	1.7	<0.034	0.33	0.01	0.29	0.11	0.0066	230	<0.015	0.0018	0.005	<0.00062	<0.00020	<0.0025	0.0027	<0.00045	<0.00089	15	6.9	0.098	<0.00020
10/31/2022	N/A	8.28	1060	135	15.56	360	-341	770	470	0.94	36.0	200	<0.13	1.7	4.1	0.930	<0.034	0.37	<0.0017	<0.047	0.054	0.0083	290	<0.015	0.0016	0.012	<0.00062	<0.00020	<0.0025	0.0017	<0.00045	<0.00089	22	10	0.073	<0.00020
3/21/2023	274.1	7.26	1300	-87	10.28	430	-355	820	220	0.9	38	180	<0.13	1.9	3.5	0.79	0.160	0.33	<0.0017	0.2	0.062	0.0057	310	<0.015	0.0014	0.016	<0.00062	<0.00020	<0.0025	0.0016	<0.00045	<0.00089	25	11	0.067	<0.00020
5/15/2023	273.0	8.99	1240	-127	17.53	450	9.9	830	20	1.0	37	160	<0.13	1.9	3.3	0.82	0.066	0.35	<0.0017	0.097	0.014	0.0052	300	<0.015	0.0018	0.018	<0.00062	<0.00020	<0.0012	0.0016	<0.00045	<0.00089	21	10	0.056	<0.00020
8/29/2023	275.16	7.07	1210	33	18.07	470	-267	840	84	1.0	36	160	<0.13	1.7	2.6	0.62	<0.034	0.37	<0.0017	<0.047	0.014	0.0046	310	<0.015	<0.00075	0.015	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	25	12	0.054	<0.00020
11/15/2023	274.25	9.04	1250	-27	12.74	450	-433	830	1.5	1.0	36	170	<0.13	1.7	3.7	0.8	<0.034	0.36	<0.0017	<0.047	0.023	0.0049	310	<0.015	0.0014	0.016	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	24	11	0.07	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																				
6/10/2024	N/A	7.55	1110	97	20.43	460	-471	850	20	1.1	38	160	<0.13	2.6	6.0	1.4	<0.034	0.33	0.0057	0.075	0.033	0.0052	310	<0.015	0.0016	0.016	<0.00062	<0.00020	<0.0012	0.0016	<0.00045	<0.00089	21	9.9	0.11	<0.00020

Record of Duplicates

	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	Ca	Mg	Al	B	Cu	Fe	Mn	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2
9/29/2015	383	<2	613		2.3	19.5	79.2	<0.2	2.69	0.95	0.0251	0.256	0.00015	0.05	0.0122	226	0.0007	0.00166	0.0435	<0.00001	<0.00005	0.0001	0.00025	0.000042	0.0002	24
9/29/2015 duplicate	367	<2	612		2.21	18.6	75.7	<0.2	2.84	1	0.0302	0.264	0.0002	0.062	0.013	237	0.0009	0.00164	0.044	<0.00001	<0.00005	0.0001	0.00031	0.00386	0.0003	24
11/16/2015	408	<2	656		2.21	22.6	97.5	<0.2	2.71	0.987	0.0688	0.263	0.00031	0.059	0.0139	234	<0.002	0.00155	0.0430	<0.00001	<0.00005	0.0002	0.00064	0.00073	0.0002	19.7
11/16/2015 duplicate	421	<2	655		2.21	22.7	98	<0.2	2.64	0.96	0.0491	0.257	0.00012	0.05	0.013	229	<0.002	0.00151	0.0429	<0.00001	<0.00005	0.0002	0.0004	0.00061	0.0002	20
3/9/2016	431	<2	748	23.9	2.07	26.6	138	<0.2	3.22	1.18	0	0.275	0.00012	0.054	0.0163	329	0.001	0.00162	0.061	<0.00002	<0.00002	<0.00005	0.0003	0.00117	0.0002	16
3/9/2016 duplicate	441	<2	726	18.7	2.04	25.9	134	<0.2	2.89	1.08	0	0.259	0.00008	0.04	0.0146	305	0.000	0.00144	0.056	<0.00002	<0.00002	<0.00005	0.0003	0.00051	0.0003	14.3
5/17/2016	491	<2	862	12.9	2.03	32.9	187	<0.2	3.05	0.987	0.0822	0.24	0.00018	0.055	0.013	250	<0.002	0.00123	0.0492	<0.00002	0.00002	0.0002	0.00032	0.00067	0.0002	17.2
5/17/2016 Duplicate	479	<2	851	12.9	2.04	32.5	184	<0.2	3.05	0.99	0.0837	0.241	0.00022	0.055	0.0135	253	<0.002	0.00123	0.048	<0.00002	0.00002	0.0002	0.00036	0.00072	0.0001	16.9
1/11/2021	340	-242	640	<2.2	1.2	20	170	<0.13	2	0.6	<0.034	0.25	<0.0017	<0.047	0.0057	260	<0.015	<0.00075	0.012	<0.00031	<0.00020	<0.00098	<0.0015	<0.00045	<0.00089	16
1/11/2021 Duplicate	340.00	-330	660	<2.2	1.2	20	170	<0.13	1.9	0.57	<0.034	0.25	<0.0017	<0.047	0.0055	250	<0.015	<0.00075	0.012	<0.00031	<0.00020	<0.00098	<0.0015	<0.00045	<0.00089	16

MW-1407

SAMPLING	Depth to SWL	pH	Cond	Redox	Temperature	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
	Field Measurements																																			
DATE	ft		microS/cm	mv	°C	mg/L CaCO3	mg/L CaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Size	43	42	42	41	42	43	43	43	33	43	43	43	43	18	43	43	43	43	43	43	43	18	43	43	43	43	43	43	43	43	43	43	43	12	18	18
Average of detected	53.13	6.72	1479	-36.5	12.5	118	-95.5	1164	118	0.09	76.0	759	0.09	3.63	202	83.3	0.105	0.111	0.00042	31.9	6.17	0.0004	20.8	0.009	0.0078	0.016	0.00006	0.00007	0.0003	0.011	0.0010	0.0001	19.9	10.0	0.700	0.00004
Std.Dev. Of detected	2.00	0.30	169	44.1	1.0	73	132.3	83	66	0.03	164.3	322	0.10	0.11	14	105.8	0.246	0.022	0.00063	4.7	1.33	0.0001	1.2	0.003	0.0023	0.004	0.00016	0.00014	0.0005	0.005	0.0028	0.0000	2.6	1.2	0.029	0.00000
Maximum of Detected	59.98	7.62	1880	103.0	15.4	570	10.5	1300	245	0.20	1100.0	2800	0.20	3.82	250	760.0	1.300	0.181	0.00250	40.6	8.27	0.0005	23.8	0.020	0.0130	0.034	0.00060	0.00047	0.0023	0.026	0.0126	0.0001	26.0	12.0	0.780	0.00025
Median of Detected	52.84	6.62	1455	-38.2	12.3	106	-62.5	1180	109	0.09	42.8	712	0.05	3.60	199	66.9	0.011	0.103	0.00016	31.6	6.06	0.0004	20.7	0.008	0.0079	0.015	0.00001	0.00002	0.0001	0.012	0.0001	0.0001	19.9	9.7	0.702	0.00004
Minimum of Detected	49.20	6.35	1218	-107.0	9.6	68	-545.0	760	21	0.05	10.8	600	0.01	3.36	184	56.4	0.002	0.078	0.00008	18.0	4.00	0.0003	18.8	0.006	0.0007	0.010	0.00001	0.00001	0.0000	0.002	0.0000	0.0000	11.4	8.6	0.650	0.00004
% of Detected	97.7	100.0	100.0	17.1	100.0	100.0	7.0	100.0	100.0	95.3	100.0	100.0	7.0	100.0	100.0	100.0	76.7	97.7	60.5	100.0	97.7	22.2	97.7	76.7	100.0	100.0	32.6	32.6	41.9	100.0	53.5	27.9	100.0	100.0	100.0	11.1
DL							<2						<0.09															<0.00005	<0.0001			<0.0005				
3/26/2015	51.88	6.40	1318	3.5	12.1	111	<2	1190		<0.2	10.8	763	<0.09		196	65.9	0.024	0.100	0.00015	32.4	7.97		19.8	0.008	0.0007	0.013	0.00001	<0.0005	<0.0001	0.013	0.00008	<0.0005	15.2			
4/11/2015						101	<2	1110		0.07	11.0	747	<0.09		196	65.6	0.003	0.101	0.00015	33.6	8.14		20.5	0.007	0.0052	0.013	<0.00001	<0.00005	<0.0001	0.012	0.00003	<0.0005	23.8			
4/27/2015	51.31	6.49	1323	-28.1	11.8	99	<2	1130		0.07	11.6	764	<0.09		199	66.8	0.222	0.102	0.00056	34.1	7.42		21.5	0.009	0.0060	0.017	0.00004	<0.0005	0.0005	0.012	0.00052	<0.0005	20.6			
5/11/2015	51.38	6.44	1303	-7.1	12.3	99	<2	1120		0.07	11.5	772	<0.09		196	65.5	0.003	0.105	0.00009	35.7	7.80		20.7	0.008	0.0059	0.013	<0.00001	<0.0005	<0.0001	0.014	0.00534	<0.0005	25.7			
5/26/2015	51.49	6.48	1314	-30.1	12.4	97	<2	1190		0.07	11.7	765	<0.09		190	63.3	0.003	0.096	0.00020	33.2	7.23		19.9	0.008	0.0062	0.013	0.00001	<0.0005	<0.0001	0.015	<0.00002	<0.0005	19.9			
6/9/2015	51.40	6.53	1317	-49.1	12.1	100	<2	1190		<0.1	12.2	792	<0.09		186	62.1	0.016	0.078	0.00013	34.2	7.23		20.1	0.008	0.0060	0.014	0.00001	<0.00005	<0.0001	0.015	0.00012	<0.0005	20.5			
6/23/2015	51.23	6.51	1323	-64.2	12.2	104	<2	1220		0.08	12.4	801	<0.09		200	68.0	0.005	0.115	0.00024	35.9	7.74		21.0	0.008	0.0059	0.013	<0.00001	<0.00005	<0.0001	0.015	0.01260	<0.0005	20.9			
7/7/2015	51.39	6.51	1324	-72.4	12.3	83	<2	1220		0.05	12.2	784	<0.09		209	70.0	0.003	0.102	0.00024	38.5	8.27		19.3	0.008	0.0060	0.014	<0.00001	<0.00005	<0.0001	0.016	0.00002	<0.0005	20.6			
7/21/2015	51.61	6.59	1327	-82.4	12.3	102	<2	1145		0.06	12.5	785	<0.09		205	69.5	0.002	0.100	0.00021	39.2	8.19		23.6	0.006	0.0059	0.010	0.00001	<0.00005	<0.0001	0.012	0.00002	<0.0005	20.5			
10/12/2015	52.10	6.64	1317	-36.6	12.2	95	<2	1220		0.06	13.0	710	<0.09		198	67.2	0.258	0.124	0.00089	38.8	7.94		20.6	0.010	0.0067	0.019	0.00003	<0.00005	0.0005	0.014	0.00090	0.0001	18.9			
3/9/2016	52.02	6.45	1478	-27.3	12.1	127	<2	1230	214	0.10	14.5	731	<0.09		186	61.5	0.007	0.119	0.00013	31.6	6.28		23.0	0.008	0.0075	0.014	<0.00002	<0.00002	<0.00005	0.015	0.00017	<0.0001	16.2			
5/17/2016	51.95	6.50	1482	-16.8	12.0	125	<2	1200	199	0.06	16.0	742	<0.09		188	63.2	0.008	0.096	0.00014	34.3	6.35		20.9	0.007	0.0079	0.015	<0.00002	<0.00002	<0.00005	0.013	0.00003	<0.0001	16.0			
8/23/2016	53.80	6.58	1469	-25.0	12.2	112	<0.4	1150	201	0.10	18.4	743	<0.09		205	68.0	0.036	0.089	0.00041	39.8	6.99		22.2	0.015	0.0081	0.025	<0.00002	<0.00002	0.0001	0.016	0.00012	<0.0002	19.3			
12/6/2016	54.65	6.60	1442	-13.9	11.8	117	<0.4	1170	194	0.10	20.9	712	<0.09		199	65.9	0.005	0.101	0.00008	38.4	7.49		20.6	0.009	0.0078	0.015	0.00001	0.00001	0.0001	0.019	0.00002	0.00006	21.9			
2/21/2017	53.34	6.58	1421	4.6	12.0	100	0.20	1145	243	0.09	23.1	725	0.045		197	56.4	0.007	0.160	0.00011	39.6	7.89		19.1	0.010	0.0064	0.014	0.00001	0.00002	0.0001	0.024	0.00002	0.00005	20.0			
6/14/2017	54.82	6.59	1436	-38.2	12.9	108	2.50	1160	168	0.09	30.8	715	0.200		184	58.0	0.089	0.200	0.00061	32.7	7.46		19.6	0.010	0.0063	0.017	0.000020	0.00002	0.000262	0.022	0.000306	0.0001	20.8			
9/13/2017	54.42	6.64	1466	-32.2	12.7	105	<0.1	990	105	0.10	33.0	727	<0.09		196	63.7	0.008	0.130	0.00014	31.7	7.44		20.7	0.008	0.0066	0.015	0.000006	<0.0001	0.000095	0.019	0.000032	0.00004	19.8			
11/8/2017	54.40	6.65	1450	-30.2	12.1	115	< 5	1180	129	0.09	33.4	747	< 0.09		190	62.7	0.011	0.112	0.00009	31.3	6.43		20.9	0.007	0.0076	0.014	0.000007	0.00002	0.000093	0.014	0.000034	0.00005	19.5			
2/6/2018	54.58	6.75	1472		11.7	111	< 5	1180	175	0.09	33.5	729	< 0.09		186	59.4	0.244	0.103	0.00067	30.5	5.98		18.8	0.0092	0.0087	0.020	0.000031	0.00006	0.000507	0.015	0.000532	0.0001	18.5			
5/1/2018	52.78	6.84	1460	15.1	12.9	106	< 5	1180	174	0.12	38.4	712	< 0.09	3.82	192	63.7	0.113	0.135	0.00040	30.1	6.12	0.000	20.1	0.007	0.0075	0.016	< 0.000004	0.00001	0.000285	0.012	0.000294	0.0001	19.7		0.714	0.00004
7/10/2018	53.02	7.25	1420	-72.1	12.8	77	< 5	1160	154	0.11	39.5	741	< 0.002	3.53	202	66.9	0.006	0.131	0.00012	29.5	5.89	0.000	20.3	0.007	0.0086	0.014	0.000007	0.00001	0.000140	0.012	0.000027	< 0.00003	19.6		0.716	0.00004
10/16/2018	53.00	6.97	1450	-71.9	12.2	114	< 8	1170	188	0.12	42.8	676	0.011	3.74	197	65.7	0.013	0.149	0.00017	29.2	5.64	0.001	19.9	0.006	0.0088	0.014	< 0.00002	0.00001	0.000045	0.010	0.000020	0.00003	18.3		0.692	< 0.0001
2/13/2019	52.70	7.16	1460	-59.6	12.2	121	< 8	1160	173	0.10	49.4	672	< 0.002	3.75	197	64.7	0.002	0.157	0.00008	29.6	6.24	< 0.0004	21.1	0.0067	0.0078	0.014	< 0.00002	0.00001	< 0.00004	0.013	< 0.00002	0.00005	21.3		0.718	< 0.0001
5/14/2019	52.90	7.37	1460	-79.9	12.5	126	< 8	1180	168	0.11	53.0	675	< 0.002	3.52	197	61.8	0.003	0.090	0.00012	27.6	5.85	0.000	19.7	0.007	0.0084	0.014	< 0.00002	0.00004	0.000100	0.010	< 0.00002	< 0.00003	21.1		0.681	< 0.0001
8/20/2019	53.18	6.50	1430	-87.2	12.9	107	< 8	1280	205	0.10	56.9	678	< 0.002	3.36	199	64.9	0.152	0.100	< 0.001	28.5	5.32	< 0.002	20.9	0.008	0.0100	0.016	< 0.0001	< 0.00005	0.000300	0.010	< 0.0002	< 0.0002	18.2		0.704	< 0.0005
11/19/2019	52.68	7.62	1440	-50.1	12.0	123	< 8	1180	109	0.09	67.3	632	< 0.002		201	66.3	0.007	0.103	< 0.0002	28.3	6.34		19.9	0.007	0.0075	0.015	< 0.00002	0.00001	0.000100	0.013	< 0.00005	0.00006	17.5			
2/18/2020	52.33	6.67	1270	-47.4	12.5	141	< 8	1220	87	0.10	71.6	675	< 0.002		198	67.5	0.010	0.121	< 0.0002	29.2	5.73		19.4	0.0055	0.0092	0.014	< 0.00002	< 0.00001	0.000100	0.009	< 0.00005	< 0.00003	18.8			
4/29/2020	52.04	7.07	1280	-77.8	12.6	125	< 8	1230	56	0.09	70.3	694	< 0.002		215	69.7	0.015	0.104	< 0.0002	27.0	5.32		22.5	0.006	0.0096	0.014	< 0.00002	0.000015	0.000100	0.009	< 0.00006	0.00008	19.2			
CIP took over sampling																																				
9/22/2020	53.27	7.18	1218	59.6	13.30	80	10.50	1180	38	0.09	79.6	678	<0.2		194	64.5	0.264	0.181	<0.002	29.5	6.91		21.7	0.020	0.0080	0.017	<0.001	<0.001	<0.002	0.012	<0.001	<0.005	11.4			
12/1/2020	55.97	6.41	1550	-57.0	9.56	87	-67.00	1100	63	0.12	66.0	690	<0.2		190	68.0	<0.05	0.120	<0.002	29.0	5.10		20.0	<0.02	0.0086	0.013	<0.001	<0.001	<0.002	0.006	<0.001	<0.005	18.0			
1/21/2021	59.98	6.57	1590	-78	11.70	100	-72.3	1200	95	0.150	56.0	700	<0.13		200	71.0	0.036	0.091	<0.0017	29.0	4.60		20.0	<0.015	0.01000	0.03400	<0.00031	<0.00020	<0.00098	0.0046	<0.00045	<0.00089	19.0			
4/5/2021	55.54	6.60	1490	-23	12.11	95	-46.1	1100	92	0.087	69.0	680	<0.13	3.70	200	68.0	1.300	0.094	<0.0035	29.0	4.60	<0.0049	19.0	0.0140	0.01300	0.02800	0.00060	0.000470	0.0023	0.0083	<0.0028	<0.0060	22.0	12.0	0.67	<0.0027
8/19/2021	58.12	7.16	1270	59	14.23	100	<5.0	1200	53	0.120	60.0	720	<0.13	3.60	200	68.0	0.570	0.096	0.00250	32.0	4.80	<0.0011	19.0	0.0190	0.01100	0.02000	<0.00062	0.000330	<0.0025	0.0068	0.00080	<0.00089	23.0	11.0	0.69	<0.00020
10/12/2021	54.50	7.04	1710	-60	14.50	100	-58	1200	65	0.100	79.0	710	<0.13	3.70	210	71.0	<0.034	0.094	<0.0017	36.0	6.00	<0.0011	20.0	<0.015	0.00960	0.01500	<0.00062	<0.00020	<0.0025	0.0110	<0.00045	<0.00089	22.0	10.0	0.78	<0.00020
3/3/2022	49.2	6.48	1680	-53	10.1	68	-38.3	1200	130	0.067	110.0	600	<0.13	3.70	220	71.0	<0.016	0.090	<0.0011	40.0	6.00	<0.00061	22.0	0.0077	0.00950	0.01600	<0.00027	<0.00022	<0.0015	0.0120	<0.00017	<0.00074	22.0	10.0	0.71	<0.00047
4/7/2022	49.6	6.63	1590	-19	12.5	89	-8.73	760	55	0.110	98.0	680	<0.13	3.70	210	760.0	0.025	0.095	`<0.0011	38.0	5.90	<0.00061	22.0	0.0075	0.00930	0.01500	<0.00027	<0.00022	<0.0015	0.0110	<0.00017	<0.00074	26.0	12.0	0.7	<0.00047
8/1/2022	53.39	6.66	1640	103	14.0	100	-56	1100	82	0.072	110.0	680	<0.13	3.60	210	71.0	<0.034	0.100	<0.0017	32.0	5.40	<0.0011	22.0	<0.015	0.00700	0.01400	<0.00062	<0.00020	<0.0025	0.0081	<0.00045	<0.00089	22.0	10.0	0.68	<0.00020
10/24/2022	52.02	7.07	1690	9	15.39	110	-101	1100	130	0.200	1100.0	2800	<0.13	3.60	210	75.0	<0.034	0.140	0.00240	18.0	4.10	<0.0011	21.0	<0.015	0.00140	0.01300	<0.00062	<0.00020	<0.0025	0.0039	<0.00045	<0.00089	18.0	8.6	0.66	<0.00020
3/9/2023	53.20	6.73	1770	-80	11.44	110	-84.4	1200	36	0.071	110.0	670	<0.13	3.70	220	76.0	<0.034	0.098	<0.0017	27.0	4.00	<0.0011	21.0	<0.015	0.01000	0.01400	<0.00062	<0.00020	<0.0025	0.0030	<0.00045	<0.00089	20.0	9.2	0.68	<0.00020
4/14/2023	52.40	6.58	1790	-89	12.79	570	-545	1200	31	0.075	120.0	670	<0.13	3.50	220	73.0	<0.034	0.130	<0.0017	27.0	4.10	<0.0011	21.0	<0.015	0.01100	0.01500	<0.00062	<0.00020	<0.0012	0.0034	0.00061	<0.00089	19.0	9.1	0.73	<0.00020
8/22/2023	54.19	6.35	1760	-79	13.90	130	-140	1300	28	0.100	130.0	670	<0.13	3.60	230	75.0	<0.034	0.110	<0.0017	26.0	4.00	<0.0011	21.0	<0.015	0.00940	0.01500	<0.00062	<0.00020	<0.0012	0.0026	<0.00045	<0.00089	20.0	9.3	0.71	<0.00020
12/4/2023	55.39	6.79	1880	-4	12.11	150	-192	1200	21	0.098	120.0	630	<0.13	3.60	240	78.0	<0.034	0.083	<0.0017	26.0	4.00	<0.0011	22.0	<0.015	0.01000	0.01600	<0.00062	<0.00020	<0.0012	0.0017	<0.00045	<0.00089	19.0	8.9	0.71	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																				
5/24/2024	52.10	6.66	1820	-107	14.22	140	-132	1100	29	0.120	130.0	630	<0.13	3.60	250	78.0	<0.034	0.110	<0.0017	28.0	4.10	<0.0011	23.0	<0.015	0.00980	0.01500	<0.00062	<0.00020	<0.0012	0.0020	<0.00045	<0.0089	20.0	9.3	0.65	<0.00020

Record of Duplicates

7/21/2015						103	<2	1090		0.060	12.5	788	<0.2		205	69.2	0.003	0.099	0.00026	39.2	8.19		23.4	0.0081	0.00774	0.01350	0.00001	<0.00005	<0.0001	0.0157	0.00002	<0.0005	20.2			
Duplicate						100	<2	1200		0.060	12.4	782	<0.2		205	69.8	0.002	0.101	0.00015	39.2	8.19		23.8	0.0043	0.00399	0.00674	0.00001	<0.00005	<0.0001	0.0084	0.00002	<0.0005	20.8			
2/21/2017						100	<0.4	1150	240	0.090	22.6	713	0		195	55.5	0.006	0.156	0.00011	40.6	8.25		18.9	0.0102	0.00590	0.01460	0.00001	0.000020	0.00005	0.0256	0.00003	0.00005	19.7			
Duplicate						101	<0.4	1140	245	0.090	23.5	737	0		198	57.3	0.008	0.163	0.00010	38.5	7.53		19.3	0.0090	0.00681	0.01420	0.00001	0.000010	0.00005	0.0220	0.00002	0.00004	20.3			
10/16/2018						112	< 8	1160	186	0.12	43.1	679	0.012	3.72	196	65.5	0.00797	0.156	0.00017	29.1	5.62	0.0005	19.8	0.006	0.00877	0.0136	< 0.00002	0.00001	0.00004	0.00948	0.00002	0.00003	18.6		0.692	< 0.0001
Duplicate						115	< 8	1180	189	0.110	42.5	672	0.01	3.76	197	65.8	0.0176	0.142	0.00016	29.3	5.66	0.0005	19.9	0.0061	0.00887	0.01360	< 0.00002	0.000010	0.00005	0.00961	< 0.00002	0.00003	18.0		0.692	< 0.0001
4/29/2020						123	< 8	1220	56	0.090	71.0	700	< 0.002		215	69.8	0.0216	0.107	< 0.0002	27.0	5.16		22.5	0.0065	0.00959	0.01360	< 0.00002	0.000020	0.0001	0.0085	< 0.00005	0.00009	19.4			
Duplicate	52.0	7.07	1280	-78	12.60	127	< 8	1240	57	0.090	69.5	688	< 0.002		215	69.5	0.008	0.101	< 0.0002	27.0	5.47		22.4	0.0058	0.00952	0.01340	< 0.00002	0.000010	0.0001	0.00859	< 0.00005	0.00007	18.9			
8/1/2022	53.4	6.66	1640	103	13.99	100	-56	1100	82	0.072	110.0	680	<0.13	3.60	210	71.0	<0.034	0.100	<0.0017	32.0	5.40	<0.0011	22.0	<0.015	0.00700	0.01400	<0.00062	<0.00020	<0.0025	0.0081	<0.00045	<0.00089	22.0	10.0	0.68	<0.00020
Duplicate						94	-52.1	1000	73	0.075	110.0	680	<0.13	3.60	210	70.0	<0.034	0.097	<0.0017	33.0	5.30	<0.0011	22.0	<0.015	0.00700	0.01400	<0.00062	<0.00020	<0.0025	0.0080	<0.00045	<0.00089	23.0	11.0	0.67	<0.00020
4/14/2023	52.4	6.58	1790	-89	12.79	570	-545	1200	31	0.075	120.0	670	<0.13	3.50	220	73.0	<0.034	0.130	<0.0017	27.0	4.10	<0.0011	21.0	<0.015	0.01100	0.01500	<0.00062	<0.00020	<0.0012	0.0034	0.00061	<0.00089	19.0	9.1	0.73	<0.00020
Duplicate						140	-123	1200	29	0.076	120.0	670	<0.13	3.50	220	72.0	<0.034	0.130	<0.0017	26.0	4.10	<0.0011	20.0	<0.015	0.01100	0.01500	<0.00062	<0.00020	<0.0012	0.0043	<0.00045	<0.00089	19.0	8.9	0.75	0.00025

MW-1408

SAMPLING DATE	Depth to SWL ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
	Field Measurements																																			
Sample Size	43	42	42	42	41	43	43	43	33	43	43	43	43	18	43	43	43	43	43	43	43	18	43	43	43	43	43	43	43	43	43	43	43	12	18	18
Average of detected	85.69	7.35	1235	-47.3	12.39	187	-141.61	964	20.9	0.30	17.5	546	0.05	3.58	174	51.9	0.013	0.157	0.00013	1.65	0.758	0.0024	41.9	0.0089	0.0156	0.0425	0.00001	0.00013	0.0001	0.00249	0.002216	0.0000	14.0	7.3	1.20	0.00116
Std.Dev. Of detected	1.51	0.34	144	97.0	1.33	10	69.57	128	59.6	0.03	1.7	58	0.07	0.22	18	5.2	0.023	0.022	0.00012	0.28	0.107	0.0005	6.1	0.0223	0.0043	0.0251	0.00001	0.00014	0.0001	0.00128	0.007896	0.0000	1.9	0.2	0.09	0.00215
Maximum of Detected	90.21	8.30	1426	353.5	16.40	206	2.50	1120	331.0	0.42	20.1	648	0.10	4.14	209	63.1	0.090	0.246	0.00045	2.14	1.010	0.0031	58.2	0.0840	0.0252	0.1980	0.00005	0.00030	0.0005	0.00679	0.034400	0.0001	16.0	7.6	1.38	0.00500
Median of Detected	85.69	7.30	1240	-76.3	12.20	189	-143.00	994	4.9	0.30	17.9	541	0.05	3.50	174	52.3	0.002	0.154	0.00009	1.61	0.742	0.0023	39.6	0.0011	0.0148	0.0362	0.00001	0.00005	0.0001	0.00244	0.000020	0.0000	14.3	7.4	1.20	0.00025
Minimum of Detected	82.68	6.52	726	-174.2	8.19	170	-307.00	414	1.9	0.24	9.7	321	0.00	3.30	101	29.9	0.001	0.126	0.00004	0.96	0.500	0.0016	34.9	0.0002	0.0039	0.0310	0.00001	0.00000	0.0000	0.00070	0.000009	0.0000	7.4	7.0	1.10	0.00001
% of Detected	97.7	100.0	100.0	16.7	100.0	100.0	4.7	100.0	93.9	100.0	100.0	100.0	4.7	100.0	100.0	100.0	62.8	97.7	53.5	97.7	100.0	94.4	97.7	32.6	100.0	100.0	20.9	16.3	37.2	88.4	44.2	9.3	100.0	100.0	100.0	27.8
DL							<2						<0.09															<0.00005	<0.0001			<0.0005				
3/26/2015	85.38	7.41	870	-11.3	12.00	180	<2	657		0.42	9.7	321	<0.09		101	29.9	0.001	0.150	<0.00005	0.96	0.500		52.1	<0.001	0.0157	0.0547	<0.00001	<0.00005	<0.0001	0.00105	0.000059	<0.0005	8.2			
4/11/2015						189	<2	913		0.31	15.4	484	<0.09		155	45.0	0.002	0.152	0.00011	1.58	0.751		57.9	<0.001	0.0213	0.0520	<0.00001	<0.00005	<0.0001	0.00071	0.000057	<0.0005	12.0			
4/27/2015	84.67	7.29	1146	-75.6	11.70	190	<2	956		0.31	16.8	524	<0.09		172	51.2	0.002	0.162	0.00010	1.70	0.802		58.2	<0.001	0.0222	0.0551	<0.00001	<0.00005	<0.0001	0.00070	<0.00002	<0.0005	12.6			
5/11/2015	84.80	7.28	1160	-62.1	12.50	186	<2	970		0.31	17.1	561	<0.09		173	51.7	0.002	0.156	0.00006	1.62	0.786		54.3	<0.001	0.0211	0.0488	<0.00001	<0.00005	<0.0001	0.00085	0.005500	<0.0005	12.9			
5/26/2015	84.58	7.30	1148	-76.9	12.30	188	<2	974		0.30	17.2	550	<0.09		163	48.3	0.003	0.142	0.00010	1.51	0.709		49.6	0.0007	0.0207	0.0458	<0.00001	<0.00005	<0.0001	0.00111	<0.00002	<0.0005	11.8			
6/9/2015	84.65	7.35	1152	-161.2	12.20	189	<2	985		0.30	17.7	562	<0.09		156	47.0	0.002	0.137	0.00006	1.32	0.660		47.5	0.0012	0.0187	0.0470	<0.00001	<0.00005	<0.0001	0.00111	0.000020	<0.0005	11.9			
6/23/2015	84.18	7.30	1164	-113.7	12.40	190	<2	988		0.33	17.6	557	<0.09		174	52.3	0.004	0.153	0.00038	1.43	0.708		50.8	0.0009	0.0180	0.0472	<0.00001	<0.00005	<0.0001	0.00114	0.034400	<0.0005	13.0			
7/7/2015	84.25	7.28	1197	-152.0	12.70	188	<2	1020		0.32	18.1	579	<0.09		188	57.2	0.002	0.156	0.00015	1.45	0.756		46.2	<0.001	0.0192	0.0473	<0.00001	<0.00005	<0.0001	0.00170	0.000097	<0.0005	12.6			
7/21/2015	84.50	7.37	1184	-174.2	12.50	188	<2	1020		0.29	18.0	569	<0.09		178	53.6	0.001	0.146	0.00015	1.37	0.703		51.8	<0.001	0.0204	0.0455	0.00005	<0.00005	<0.0001	0.00176	0.000020	<0.0005	12.8			
10/12/2015	85.90	7.45	1182	-126.4	12.20	194	<2	1030		0.34	18.5	536	<0.09		182	55.7	0.007	0.148	0.00045	1.70	0.677		43.3	<0.002	0.0234	0.0465	0.00001	<0.00005	0.00010	0.00181	0.000496	<0.0001	13.7			
3/9/2016	82.68	7.22	1372	-41.1	12.20	191	<2	1050	11	0.32	18.7	578	<0.09		174	52.8	0.001	0.145	0.00005	1.29	0.566		45.6	<0.002	0.0252	0.0439	<0.00002	<0.00002	<0.00005	0.00264	<0.00002	<0.0001	11.8			
5/17/2016	84.70	7.21	1418	-104.3	12.10	189	<2	1110	13	0.26	20.1	628	<0.09		187	56.8	0.002	0.126	0.00007	1.42	0.698		39.5	<0.002	0.0222	0.0418	<0.00002	<0.00002	<0.00005	0.00319	0.000020	<0.0001	11.6			
8/23/2016	87.84	7.22	1426	-77.0		201	<0.4	1120	14	0.29	19.1	648	<0.09		205	61.7	0.047	0.131	0.00041	2.06	0.858		42.3	0.0840	0.0205	0.1980	<0.00002	0.00005	0.000100	0.00354	0.001240	<0.0002	14.5			
12/6/2016	86.85	7.31	1413	-30.0	11.60	200	<0.4	1100	9	0.28	19.0	612	<0.09		209	63.1	0.002	0.156	0.00004	2.14	1.010		42.6	<0.002	0.0192	0.0409	0.00001	<0.000004	0.000100	0.00445	0.000010	<0.00003	15.1			
2/21/2017	86.28	7.33	1408	353.5	11.90	195	0.20	1100	6	0.24	18.3	629	0.10		200	52.6	0.00060	0.144	0.00008	2.07	0.963		39.0	0.0002	0.0162	0.0355	0.00001	0.000002	0.000050	0.00444	0.000009	0.0000	14.3			
6/14/2017	85.28	7.34	1383	-78.9	13.70	199	2.50	1080	34	0.26	19.0	616	0.005		197	57.5	0.00518	0.165	0.00021	2.03	0.958		42.0	0.0002	0.0144	0.0373	0.00001	0.0000025	0.000085	0.00423	0.000020	0.00004	14.9			
9/13/2017	86.15	7.36	1376	-72.5	12.70	195	<0.1	1080	331	0.26	18.7	624	<0.09		190	56.5	0.00238	0.155	0.00005	2.04	0.910		41.2	0.0004	0.0151	0.0371	0.00001	0.0003	0.000060	0.00679	0.000020	<0.00003	13.5			
11/8/2017	86.67	7.33	1356	-48.3	11.80	197	< 5	1050	14.9	0.28	19.1	613	< 0.09		188	55.8	0.00090	0.156	0.00005	1.89	0.887		42.7	< 0.0004	0.0136	0.0387	0.00001	< 0.000005	0.000096	0.00374	0.000009	< 0.00003	14.0			
2/6/2018	86.60	7.47	1360	-63.7	11.00	185	< 5	1050	59	0.29	18.4	618	< 0.09		187	53.4	0.02840	0.174	0.00010	2.12	0.861		38.2	0.0004	0.0148	0.0389	0.00001	0.000009	0.000040	0.00364	0.000055	< 0.00003	14.1			
5/1/2018	84.31	7.23	1320	-33.3	12.70	187	< 5	1050	6	0.31	19.2	604	< 0.09	4.14	190	56.5	0.00235	0.168	0.00009	2.12	0.907	0.00306	40.7	0.0023	0.0138	0.0363	< 0.000004	< 0.000005	0.000054	0.00294	0.000040	0.00004	14.3		1.38	< 0.00001
7/10/2018	85.40	7.83	1330	-96.1	13.40	192	< 5	1030	4	0.31	19.2	598	< 0.002	3.76	188	55.7	0.00200	0.154	0.00006	1.88	0.850	0.00306	39.4	< 0.0004	0.0125	0.0350	0.00001	< 0.000005	0.000084	0.00312	0.000010	< 0.00003	15.0		1.33	0.00001
10/16/2018	85.75	7.60	1310	-90.4	12.20	199	< 8	1040	2.8	0.30	18.0	541	< 0.002	3.79	181	53.6	0.04110	0.246	0.00011	1.90	0.800	0.00313	38.3	0.0020	0.0138	0.0363	< 0.00002	< 0.00001	0.000100	0.00291	0.000020	< 0.00003	14.0		1.29	< 0.0001
2/13/2019	84.25	7.78	1320	-91.9	11.80	205	< 8	1040	3	0.30	18.8	562	< 0.002	3.90	180	53.4	0.00100	0.133	0.00006	1.83	0.805	0.00270	39.7	< 0.0007	0.0137	0.0349	< 0.00002	< 0.00001	< 0.00004	0.00265	< 0.00002	< 0.00003	15.4		1.3	< 0.0001
5/14/2019	84.50	8.03	1260	-101.0	12.20	204	< 8	1030	3	0.30	18.2	552	< 0.002	3.68	177	49.7	0.00300	0.142	0.00006	1.71	0.764	0.00274	37.0	0.0007	0.0136	0.0354	< 0.00002	< 0.00001	0.000100	0.00272	< 0.00002	< 0.00003	15.3		1.23	< 0.0001
8/20/2019	86.05	7.20	1250	-103.4	13.10	184	< 8	1060	2	0.28	18.1	544	< 0.002	3.75	181	52.8	0.09000	0.200	< 0.001	1.63	0.722	0.00300	40.0	< 0.004	0.0131	0.0362	< 0.0001	< 0.00005	0.000500	0.00289	< 0.0002	< 0.0002	13.7		1.29	< 0.0005
11/19/2019	86.43	8.30	1250	-90.9	11.80	196	< 8	994	3.3	0.28	17.9	522	< 0.002		175	52.6	< 0.005	0.126	< 0.0002	1.54	0.742		34.9	< 0.0007	0.0134	0.0349	< 0.00002	< 0.00001	0.000095	0.00242	< 0.00005	< 0.00003	13.7			
2/18/2020	85.10	7.36	1070	-108.5	12.00	206	< 8	1010	3	0.29	18.0	533	< 0.002		171	52.3	< 0.005	0.140	< 0.0002	1.79	0.746		35.9	< 0.0007	0.0142	0.0347	< 0.00002	< 0.00001	0.000070	0.00235	< 0.00005	< 0.00003	15.2			
4/29/2020	84.18	7.79	1070	-98.3	12.20	178	< 8	1010	2	0.26	17.8	542	< 0.002		187	54.4	< 0.005	0.137	< 0.0002	1.65	0.737		41.4	0.0020	0.0142	0.0334	< 0.00002	< 0.00001	0.000100	0.00246	< 0.00005	0.00007	13.5			
CIP took over sampling																																				
9/22/2020	86.10	7.59	726	-150.6	16.40	174	-135.00	414	<4	0.33	17.6	540	<0.2		171	51.6	<0.05	0.185	<0.002	1.59	0.797		38.1	0.0200	0.0148	0.0346	<0.001	<0.001	<0.002	0.00275	<0.001	<0.005	7.4			
12/1/2020	88.97	6.97	1180	-62.0	11.75	170	-158.00	890	<4	0.35	17.0	510	<0.2		160	51.0	<0.05	0.180	<0.002	1.50	0.710		39.0	<0.02	0.0140	0.0330	<0.001	<0.001	<0.002	0.00160	<0.001	<0.005	15.0			
1/21/2021	90.21	6.99	1220	-77	11.24	170	-139	880	4	0.35	17.0	510	<0.13		160	51.0	<0.034	0.150	<0.0017	1.7	0.70		40.0	<0.015	0.0130	0.0370	<0.00031	<0.00020	<0.00098	0.00190	<0.00045	<0.00089	15.0			
4/5/2021	86.80	7.22	1170	-38	12.19	180	-146	950	2	0.31	17.0	520	<0.13	3.60	170	53.0	0.052	0.140	<0.0035	1.5	0.75	<0.0049	39.0	0.0097	0.0120	0.0360	<0.00060	0.00030	<0.00063	0.00420	<0.0028	<0.0060	16.0	7.5	1.2	0.005
8/16/2021	85.67	8.14	996	137	16.20	180	-183	1000	3	0.34	17.0	530	<0.13	3.50	160	49.0	0.054	0.160	<0.0017	1.9	0.72	0.0026	37.0	<0.015	0.0150	0.0310	<0.00062	0.00022	<0.0025	<0.0026	<0.00045	<0.00089	15.0	7.0	1.2	0.00031
12/28/2021	88.93	6.99	1360	115	10.57	190	-150	810	11	0.26	18.0	510	<0.13	3.40	160	49.0	<0.013	0.170	<0.00063	<0.020	0.68	0.0023	37.0	<0.0032	0.0039	0.0320	<0.00018	<0.00022	<0.0015	0.00250	<0.00013	<0.0015	15.0	7.0	1.2	0.00024
3/3/2022	84.61	7.13	1350	-46	8.19	180	-132	960	67	0.26	19.0	530	<0.13	3.50	180	52.0	<0.016	0.150	<0.0011	1.5	0.77	0.0021	40.0	<0.0029	0.0110	0.0350	<0.00027	<0.00022	<0.0015	0.00220	<0.00017	<0.00074	15.0	7.0	1.2	<0.00047
4/6/2022	86.10	7.24	1190	81	12.47	180	-133	910	6	0.33	17.0	540	<0.13	3.50	170	54.0	<0.016	0.160	<0.0011	1.6	0.71	0.0020	38.0	<0.0029	0.0100	0.0320	<0.00027	<0.00022	<0.0015	0.00170	<0.00017	<0.00074	16.0	7.4	1.2	<0.00047
8/1/2022	84.68	7.28	1210	106	13.75	170	-129	820	11	0.31	17.0	530	<0.13	3.40	160	49.0	<0.034	0.150	<0.0017	1.3	0.72	0.0023	37.0	<0.015	0.0095	0.0320	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	16.0	7.4	1.1	<0.00020
10/17/2022	86.07	7.44	1230	95	12.57	180	-108	830	4.4	0.30	16.0	500	<0.13	3.60	170	51.0	<0.034	0.160	<0.0017	1.2	0.72	0.0021	38.0	<0.015	0.0100	0.0320	<0.00062	<0.00020	<0.0025	0.00180	<0.00045	<0.00089	16.0	7.6	1.1	<0.00020
3/9/2023	85.71	7.14	1280	-84	11.47	170	-143	910	4.9	0.28	16.0	490	<0.13	3.50	160	48.0	<0.034	0.170	<0.0017	1.4	0.57	0.0021	38.0	<0.015	0.0120	0.0340	<0.00062	<0.00020	<0.0025	0.00150	<0.00045	<0.00089	16.0	7.3	1.1	<0.00020
4/14/2023	83.15	6.68	1330	-59	12.18	190	-163	900	1.9	0.33	16.0	520	<0.13	3.50	170	47.0	<0.034	0.190	<0.0017	1.5	0.71	0.0020	36.0	<0.015	0.0120	0.0350	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	16.0	7.3	1.2	<0.00020
8/22/2023	85.98	6.52	1190	-18	13.29	180	-199	890	3.7	0.31	16.0	500	<0.13	3.40	170	47.0	<0.034	0.170	<0.0017	1.6	0.66	0.0016	37.0	<0.015	0.0170	0.0340	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	16.0	7.5	1.1	<0.00020
12/4/2023	87.00	7.19	1320	39	12.07	170	-307	880	2.6	0.29	15.0	470	<0.13	3.30	160	46.0	<0.034	0.150	<0.0017	1.6	0.64	0.0016	36.0	<0.015	0.0170	0.0330	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	15.0	7.1	1.1	0.00025
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																				
5/24/2024	87.20	7.13	1230	-95	14.66	190	-185	890	5.8	0.34	16.0	470	<0.13	3.30	170	48.0	<0.034	0.170	<0.0017	1.8	0.92	0.0017	38.0	<0.015	0.0160	0.0360	<0.00062	<0.00020	<0.0012	0.0015	<0.00045	<0.00089	16.0	7.5	1.1	<0.00020

Record of Duplicates

11/19/2019	86.43	8.30	1250	-90.9	11.80	193	< 8	1010	3.3	0.28	17.9	520	< 0.002		175	52.7	< 0.005	0.126	< 0.0002	1.54	0.744		35.0	< 0.0007	0.0134	0.0347	< 0.00002	< 0.00001	0.00009	0.00244	< 0.00005	< 0.00003	13.7			
Duplicate						198	< 8	978	3.3	0.280	17.9	524	< 0.002		175	52.4	< 0.005	0.125	< 0.0002	1.53	0.740		34.8	< 0.0007	0.0134	0.0351	< 0.00002	< 0.00001	0.0001	0.00240	< 0.00005	< 0.00003	13.6			
12/28/2021	88.93	6.99	1360	115	10.57	190	-150	810	11	0.26	18.0	510	<0.13	3.40	160	49.0	<0.013	0.170	<0.00063	<0.020	0.68	0.0023	37.0	<0.0032	0.0039	0.032	<0.00018	<0.00022	<0.0015	0.0025	<0.00013	<0.0015	15.0	7.0	1.2	0.00024
Duplicate						180	-143	810	13	0.26	18.0	510	<0.13	3.5	170	51.0	0.02	0.160	0.00091	1.60	0.73	0.0023	39.0	<0.0032	0.0120	0.035	0.00023	<0.00022	<0.0015	0.0032	0.00013	<0.0015	15.0	7.1	1.2	0.00015
8/1/2022	84.68	7.28	1210	106	13.75	170	-129	820	11	0.31	17.0	530	<0.13	3.40	160	49.0	<0.034	0.150	<0.0017	1.3	0.72	0.0023	37.0	<0.015	0.0095	0.032	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	16.0	7.4	1.1	<0.00020
Duplicate						170	-141	890	11	0.31	17.0	530	<0.13	3.40	160	49.0	<0.034	0.150	<0.0017	1.2	0.71	0.0019	37.0	<0.015	0.0088	0.031	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	16.0	7.3	1.1	<0.00020
4/14/2023	83.15	6.68	1330	-59	12.18	190	-163	900	1.9	0.33	16.0	520	<0.13	3.5	170	47.0	<0.034	0.190	<0.0017	1.50	0.710	0.002	36.0	<0.015	0.0120	0.035	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	16.0	7.3	1.2	<0.00020
Duplicate						140	-128	910	2.5	0.34	16.0	500	<0.013	3.4	160	46.0	<0.034	0.180	<0.0017	1.50	0.700	0.002	36.0	<0.015	0.0120	0.03500	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	15.0	7.1	1.2	<0.00020

MW-1409

		Field Measurements																																		
SAMPLING	Depth to SWL	pH	Cond	Redox	Temperature	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
DATE	ft		microS/cm	mv	°C	mg/L CaCO3	mg/L CaCO3	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Size	41	41	41	41	41	43	43	43	33	41	43	43	43	18	43	43	43	43	43	43	43	18	43	43	43	43	43	43	43	43	42	43	43	12	18	18
Average of detected	97.69	7.59	343	-3.2	13.4	151	-94.4	620	204	0.50	85.74	260.6	0.09	6.25	72.3	28.6	0.226	2.030	0.00078	1.469	0.94	0.0002	100.3	0.005	0.0005	0.0782	0.00004	0.00006	0.0005	0.00137	0.0005979	0.0002	12.9	6.7	1.095	0.00026
Std.Dev. Of detected	3.00	0.40	81	63.2	2.8	24	89.1	1180	341	0.09	242.59	673.7	0.07	6.49	89.3	46.3	0.649	5.051	0.00083	3.490	2.52	0.0000	255.8	0.006	0.0005	0.0203	0.00004	0.00009	0.0010	0.00146	0.0010992	0.0004	5.1	1.4	0.821	0.00023
Maximum of Detected	112.00	8.34	636	165.0	22.4	180	30.0	5000	1300	0.64	960.00	2700.0	0.17	21.00	380.0	180.0	3.500	21.000	0.00310	14.000	10.00	0.0002	1100.0	0.020	0.0021	0.1100	0.00010	0.00034	0.0048	0.00570	0.0039500	0.0010	34.3	10.0	2.500	0.00049
Median of Detected	98.04	7.57	318	-14.0	12.3	150	-118.0	216	44	0.52	1.71	31.0	0.05	2.96	42.0	12.6	0.017	0.302	0.00043	0.162	0.07	0.0002	11.0	0.002	0.0002	0.0840	0.00002	0.00003	0.0002	0.00090	0.0001910	0.0001	11.4	6.6	0.615	0.00036
Minimum of Detected	94.13	5.91	226	-96.0	11.0	10	-334.0	29	5	0.23	1.18	1.9	0.05	2.27	13.4	4.0	0.002	0.105	0.00014	0.021	0.00	0.0002	3.3	0.001	0.0001	0.0230	0.00000	0.00001	0.0001	0.00010	0.0000100	0.0000	1.8	5.2	0.520	0.00001
% of Detected	97.6	100.0	100.0	41.5	100.0	100.0	9.3	100.0	97.0	100.0	97.7	100.0	7.0	100.0	100.0	100.0	69.8	97.7	67.4	97.7	100.0	11.1	95.3	55.8	79.1	100.0	16.3	32.6	51.2	81.4	59.5	18.6	100.0	91.7	100.0	27.8
DL							<2						<0.09															<0.00005	<0.0001			<0.0005				
3/26/2015	96.53	7.53	340	-42.2	11.9	148	<2	216		0.52	2.10	42.8	<0.09		44.4	14.0	0.011	0.280	0.00048	0.168	0.05		11.3	0.003	0.0002	0.0615	<0.00001	<0.00005	<0.0001	0.00100	0.0001910	<0.0005	7.7			
4/11/2015						150	<2	218		0.51	2.00	33.7	<0.09		42.4	12.9	0.002	0.285	0.00027	0.145	0.07		11.4	<0.001	0.0002	0.0694	<0.00001	<0.00005	<0.0001	0.00030	0.0000210	<0.0005	25.4			
4/27/2015	98.30	7.57	315	-58.1	11.5	150	<2	228		0.54	1.90	32.3	<0.09		44.7	13.6	0.004	0.301	0.00018	0.147	0.08		11.8	<0.001	0.0002	0.0777	<0.00001	<0.00005	<0.0001	0.00014	0.0000650	<0.0005	11.3			
5/11/2015	98.67	7.61	315	-36.6	12.3	148	<2	222		0.53	1.90	30.6	<0.09		42.8	13.0	0.004	0.289	0.00018	0.161	0.07		11.0	<0.001	0.0001	0.0757	<0.00001	<0.00005	<0.0001	0.00014	0.0035800	<0.0005	12.5			
5/26/2015	98.48	7.56	313	-11.3	12.1	148	<2	225		0.52	1.90	29.3	<0.09		40.8	12.3	0.022	0.270	0.00058	0.072	0.07		10.6	0.003	0.0005	0.0772	<0.00001	<0.00005	0.0014	0.00133	0.0000560	<0.0005	34.3			
6/9/2015	98.78	7.65	314	-39.8	12.0	150	<2	215		0.61	1.80	28.9	<0.09		40.5	12.4	0.007	0.284	0.00016	0.036	0.05		11.2	<0.001	0.0005	0.0810	<0.00001	<0.00005	<0.0001	0.00099	0.0000330	<0.0005	11.3			
6/23/2015	98.68	7.51	309	-11.4	12.2	149	<2	227		0.57	1.80	27.2	<0.09		43.5	13.2	0.009	0.295	0.00031	0.027	0.07		10.0	0.001	0.0006	0.0823	<0.00001	<0.00005	<0.0001	0.00149	0.0003850	<0.0005	11.7			
7/7/2015	98.79	7.70	317	22.2	13.7	156	<2	236		0.61	1.80	31.0	<0.09		46.0	13.8	0.010	0.318	0.00027	0.021	0.09		9.9	0.001	0.0004	0.0795	<0.00001	<0.00005	<0.0001	0.00101	0.0000320	<0.0005	12.1			
7/21/2015	98.94	7.68	320	-26.5	12.3	152	<2	229		0.64	2.20	30.5	<0.09		43.5	13.2	0.314	0.304	0.00132	0.527	0.09		13.3	0.004	0.0010	0.0880	0.00009	0.00005	0.0006	0.00203	0.0004840	<0.0005	12.3			
10/12/2015	100.25	7.77	314	-26.3	12.7	156	<2	276		0.58	1.80	28.5	<0.09		43.6	13.4	0.003	0.312	0.00066	0.053	0.07		12.2	<0.002	0.0004	0.0871	<0.00001	0.00006	<0.0001	0.00060	0.0002380	<0.0001	10.9			
3/23/2016	99.47	7.47	366	-19.8	11.7	173	<2	272	941	0.54	1.54	30.9	<0.09		42.9	13.1	0.169	0.310	0.00037	0.382	0.09		11.7	0.002	0.0003	0.0860	0.00002	<0.00002	0.0003	0.00080	0.0003115	<0.0001	19.4			
5/17/2016	97.57	7.44	352	6.3	12.2	167	<2	206	1120	0.54	1.34	39.6	<0.09		41.3	12.4	0.02460	0.264	0.00026	0.134	0.0859		10.1	0.002	0.00020	0.0765	<0.00002	<0.00002	0.000100	0.00061	0.0000670	<0.0001	8.7			
8/23/2016						159	<0.4	266	230	0.48	1.33	35.8	<0.09		41.9	13.0	0.06570	0.245	0.00043	0.313	0.0566		9.6	0.019	0.00020	0.1090	<0.00002	<0.00002	0.000400	0.00040	0.0003150	<0.0002	10.4			
12/6/2016	99.00	7.46	356	38.1	11.1	149	<0.4	276	356	0.52	1.85	36.7	<0.09		45.5	13.7	0.01750	0.308	0.00020	0.167	0.0753		12.2	0.003	0.00028	0.0845	0.000007	0.00003	0.000100	0.00092	0.0000560	<0.00003	11.4			
2/21/2017	100.96	7.40	350	43.1	12.1	169	0.20	250	587	0.59	1.54	28.8	0.045		42.3	11.5	0.04060	0.269	0.00114	0.102	0.0652		10.9	0.003	0.00022	0.0787	0.000003	0.00012	0.000104	0.00090	0.0000860	0.00005	11.6			
6/14/2017	98.50	7.44	350	-40.0	12.9	160	2.50	198	19	0.48	1.27	28.1	0.045		42.4	12.6	0.00696	0.292	0.00051	0.177	0.0447		11.0	0.001	0.00012	0.0825	0.000002	0.00002	0.000099	0.00043	0.0000250	0.000015	11.9			
9/13/2017	97.97	7.59	353	-3.9	13.8	162	<0.1	232	630	0.52	1.22	34.4	<0.09		41.6	12.2	0.01650	0.305	0.00047	0.098	0.0796		12.3	0.002	0.00023	0.0883	<0.000004	<0.0001	0.000094	0.00042	0.0000660	<0.00003	11.2			
11/8/2017	98.63	7.46	350	20.7	11.9	159	< 5	213	58	0.47	1.18	34.4	< 0.09		42.7	12.7	0.00505	0.307	0.00026	0.123	0.0451		11.5	0.001	0.00012	0.0840	< 0.000004	0.00001	0.000081	0.00024	0.0000100	< 0.03	10.8			
2/6/2018	98.95	7.55	363	42.1	11.0	171	< 5	196	26	0.53	1.89	37.2	< 0.09		42.4	12.4	0.42600	0.336	0.00128	1.01	0.0694		10.9	0.005	0.00041	0.0884	0.000037	0.00002	0.000835	0.00142	0.0006720	0.00010	11.2			
5/1/2018	96.67	7.68	331	72.4	12.9	161	< 5	205	170	0.52	1.72	28.8	< 0.002	2.91	40.4	12.2	0.08780	0.327	0.00116	0.363	0.1100	0.000	10.2	0.003	0.00015	0.0772	< 0.000004	0.00003	0.000251	0.00117	0.0002450	0.000050	19.2		0.597	0.00001
7/10/2018	95.66	7.86	304	-96.0	12.2	154	< 5	167	10	0.51	1.51	23.9	< 0.002	2.27	37.7	11.3	0.00335	0.269	0.00017	0.139	0.0443	0.000	8.8	0.001	0.00009	0.0783	< 0.000004	0.00001	0.000060	0.00030	0.0000100	< 0.00003	10.4		0.538	0.00002
10/16/2018	95.55	7.69	300	-34.0	12.1	137	< 8	170	5	0.45	1.36	21.0	< 0.002	2.32	36.5	11.1	0.01370	0.261	0.00021	0.163	0.0435	< 0.0004	8.0	0.002	0.00010	0.0812	< 0.00002	< 0.00001	0.000050	0.00011	< 0.00002	< 0.00003	9.3		0.52	< 0.0001
2/13/2019	94.13	7.92	311	-54.7	11.7	143	< 8	196	78	0.50	1.63	22.9	< 0.02	3.03	42.0	12.6	0.58700	0.282	0.00188	2.9	0.1390	< 0.0004	11.3	0.013	0.00077	0.1090	0.000102	0.00004	0.001210	0.00409	0.0039500	0.00070	10.5		0.609	< 0.0001
5/14/2019	94.34	8.29	299	-71.7	12.4	149	< 8	181	13	0.47	1.33	20.5	< 0.002	2.34	37.0	10.7	0.00495	0.233	0.00014	0.121	0.0398	< 0.0004	8.3	0.001	0.00006	0.0848	< 0.00002	< 0.00001	0.000090	0.00013	< 0.00002	< 0.00003	10.8		0.52	< 0.0001
8/20/2019	94.74	7.30	304	-72.2	13.0	148	< 8	216	315	0.48	1.41	24.2	< 0.002	2.44	37.3	11.0	0.10200	0.302	< 0.001	0.187	0.0582	< 0.002	9.3	< 0.004	0.00020	0.0931	< 0.0001	< 0.00005	0.000400	< 0.0005	< 0.0002	< 0.0002	9.8		0.541	< 0.0005
11/19/2019	95.09	8.30	314	-48.1	11.9	157	< 8	302	47	0.50	1.41	25.1	< 0.002		38.5	11.6	0.00800	0.266	0.00040	0.111	0.0597		8.6	0.002	0.00011	0.0860	< 0.00002	0.00002	0.000200	0.00040	< 0.00005	0.0	9.7			
2/18/2020	95.33	7.65	268	11.5	12.0	147	< 8	212	40	0.51	1.52	22.4	< 0.002		38.9	11.8	< 0.005	0.278	0.00116	0.08	0.0449		8.9	0.002	0.00011	0.0918	< 0.00002	0.00007	0.000200	0.00030	< 0.00005	< 0.00003	11.0			
4/29/2020	94.19	7.84	266	-67.3	12.4	150	< 8	184	6	0.48	1.41	21.8	< 0.002		41.1	11.8	< 0.005	0.283	< 0.0002	0.123	0.0421		9.6	0.002	0.00008	0.0894	< 0.00002	0.00001	0.000080	0.00010	< 0.00005	0.000040	10.0			
CIP took over sampling																																				
9/22/2020	95.42	8.34	284	21.6	15.60	10	-38	29	<4		<1	1.9	<0.2		13.4	4.0	<0.05	0.105	<0.002	0.054	0.0047		3.3	0.020	<0.005	0.0286	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	1.8			
11/23/2020	96.21	7.20	333	-38.0	11.86	150	-131.00	210	1300		1.50	27.0	<0.2		38.0	11.0	<0.05	0.310	<0.002	0.088	0.0710		11.0	<0.02	0.00130	0.0880	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	10.0			
1/13/2021	96.89	7.43	345	70	10.96	150	-147	190	16	0.57	1.30	34.0	<0.13		42.0	13.0	<0.034	0.320	<0.0017	0.25	0.09		11.0	<0.015	<0.00075	0.086	<0.00031	<0.00020	<0.00098	<0.0015		<0.00089	12.0			
4/12/2021	99.06	7.21	363	63	12.48	150	-128	190	14	0.52	1.20	38.0	<0.13	2.60	41.0	13.0	0.310	0.320	<0.0035	0.27	0.071	<0.0049	10.0	<0.0097	<0.0041	0.087	<0.00060	<0.00020	0.00063	0.00310	<0.0028	<0.0060	11.0	5.4	0.58	<0.0027
9/1/2021	97.32	8.02	226	16	21.42	140	8.3	180	18	0.59	1.40	28.0	<0.13	3.00	39.0	12.0	0.820	0.290	0.00310	1.1	0.100	<0.0011	10.0	<0.015	<0.00075	0.087	<0.00062	0.00034	<0.0025	0.00210	0.00090	<0.00089	14.0	6.4	0.59	0.00049
10/13/2021	112.00	8.09	275	-33	14.2	150	-129	210	12	0.58	1.20	34.0	<0.13	2.70	40.0	12.0	<0.034	0.310	<0.0017	0.15	0.097	<0.0011	11.0	<0.015	<0.00075	0.090	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	12.0	5.5	0.66	<0.00020
3/1/2022	97.01	7.45	319	32	14.1	140	-78.7	210	6.1	0.40	1.80	39.0	<0.13	2.70	45.0	12.0	0.190	0.350	<0.0011	0.46	0.091	<0.00061	14.0	<0.0029	<0.00028	0.094	<0.00027	<0.00022	<0.0015	0.00056	0.00045	<0.00074	14.0	6.6	0.62	<0.00047
7/29/2022	95.13	7.29	318	116	17.5	140	-127.0	310	95.0	0.51	2.30	46.0	0	3.90	42.0	13.0	3.500	0.260	0.00310	2.7	0.090	<0.0011	11.0	0.016	0.00078	0.110	<0.00062	<0.00020	0.00480	0.00570	0.00270	<0.00089	22.0	10.0	0.61	0.00036
8/8/2022	94.51	7.53	285	165	22.4	150	-118	130	32	0.56	1.70	38.0	<0.13	2.70	42.0	12.0	<0.034	0.290	0.00210	<0.047	0.079	<0.0011	11.0	<0.015	<0.00075	0.085	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	11.0	5.2	0.63	<0.00020
11/1/2022	N/A	7.97	468	165	13.55	150	-113	280	49	0.53	13.00	87.0	<0.13	3.20	61.0	17.0	<0.034	0.330	<0.0017	0.058	0.120	<0.0011	17.0	<0.015	<0.00075	0.083	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	12.0	5.5	0.9	<0.00020
3/9/2023	98.68	7.19	279	-88	12.73	160	-123	2600	39	0.33	440.00	1300.0	<0.13	8.20	250.0	130.0	<0.034	8.600	<0.0017	9.1	5.700	<0.0011	510.0	<0.015	0.00150	0.045	<0.00062	<0.00020	<0.0025	0.00300	<0.00045	<0.00089	15.0	7.2	2.5	<0.00020
5/15/2023	98.11	7.63	419	-73	13.38	170	30	2600	31	0.51	460.00	1200.0	<0.13	9.20	220.0	110.0	<0.034	11.00	<0.0017	1.4	4.800	<0.0011	510.0	<0.015	<0.00075	0.042	<0.00062	<0.00020	<0.0012	0.00310	<0.00045	<0.00089	14.0	`6.3	1.9	<0.00020
9/5/2023	98.89	5.91	636	61	17.34	180	-10.7	3800	160	0.23	960.00	2700.0	<0.13	21.00	360.0	180.0	<0.034	21.00	<0.0017	11.0	10.00	<0.0011	1100.0	<0.015	0.00140	0.031	<0.00062	<0.00020	<0.0012	0.00400	<0.00045	0.00095	17.0	7.7	2.5	<0.00020
12/4/2023	99.89	8.05	608	-14	10.99	180	-334	4500	80	0.32	830.00	2400.0	<0.13	18.00	330.0	160.0	<0.034	16.00	<0.0017	13.0	8.800	<0.0011	800.0	<0.015	0.00110	0.034	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	15.0	6.9	2.4	0.00042
6/20/2024	94.50	7.12	503	-91	21.04	160	-169	5000	13	0.24	840.00	2400.0	<0.13	20.00	380.0	180.0	<0.034	18.00	<0.0017	14.0	8.500	<0.0011	810.0	<0.015	0.00210	0.023	<0.00062	<0.00020	<0.0012	0.00470	<0.00045	<0.00089	16.0	7.6	2.5	<0.00020

Record of Duplicates

3/23/2016						173		274	958	0.53	1.53	30.7	<0.2		43.4	13.3	0.1660	0.312	0.00041	0.373	0.0867		11.8	0.002	0.0003	0.087	<0.00002	<0.00002	0.0003	0.0008	0.00029	<0.0001	19.0			
3/23/2016 Duplicate						172		270	924	0.54	1.55	31.0	<0.2		42.4	12.9	0.1710	0.307	0.00033	0.391	0.0848		11.5	0.002	0.0003	0.085	0.00002	<0.00002	0.0003	0.0008	0.00034	<0.0001	19.8			
5/14/2019	94.34	8.29	299	-71.7	12.4	152	< 8	179	13.4	0.47	1.33	20.4	< 0.002	2.24	35.9	10.4	0.002	0.227	0.00011	0.123	0.0407	< 0.0004	8.14	0.0008	0.00006	0.0842	< 0.00002	< 0.00001	0.00008	0.00011	< 0.00002	< 0.00003	10.7		0.504	< 0.0001
duplicate						145	< 8	182	12	0.47	1.33	20.5	< 0.002	2.44	38	11	0.0079	0.239	0.00017	0.119	0.0389	< 0.0004	8.51	< 0.0007	0.00006	0.0853	< 0.00002	< 0.00001	0.0001	0.00014	< 0.00002	< 0.00003	10.8		0.535	< 0.0001

MW-1507C

SAMPLING	Field Measurements																																			
DATE	Depth to SWL ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	34	33	33	33	33	33	33	33	33	33	33	32	33	18	33	33	33	33	33	33	33	18	33	33	33	33	33	33	33	33	33	33	33	12	18	18
Average of detected	91.13	7.65	429	-62.2	12.56	183	-140.1	264	7.5	0.19	6.75	45.0	0.140	1.94	44.2	13.8	0.00909	0.075	0.00107	0.660	0.168	0.00064	31.7	0.0048	0.00026	0.239	0.000009	0.000072	0.000074	0.00027	0.000026	0.00053	12.2	5.8	0.247	0.00166
Std.Dev. Of detected	1.56	0.50	244	78.9	1.41	23	62.0	194	19.1	0.02	6.60	119.6	0.120	0.16	34.6	12.0	0.01674	0.023	0.00244	0.717	0.190	0.00043	3.7	0.0071	0.00022	0.074	0.000005	0.000120	0.000022	0.00038	0.000042	0.00084	1.3	0.2	0.013	0.00208
Maximum of Detected	92.95	8.78	1513	189.0	16.34	225	2.5	1140	98.2	0.24	36.20	596.0	0.274	2.41	206.0	70.4	0.06000	0.145	0.01000	4.150	1.060	0.00150	48.2	0.0200	0.00100	0.300	0.000020	0.000250	0.000100	0.00142	0.000136	0.00150	14.0	6.2	0.270	0.00400
Median of Detected	91.68	7.52	353	-97.9	12.20	180	-161.0	210	2.5	0.18	4.50	7.2	0.100	1.90	32.7	9.8	0.00263	0.068	0.00012	0.451	0.102	0.00050	31.0	0.0015	0.00017	0.269	0.000009	0.000017	0.000073	0.00014	0.000010	0.00006	12.0	5.8	0.244	0.00096
Minimum of Detected	85.13	6.93	269	-134.9	10.20	82	-213.0	120	0.3	0.13	3.70	2.7	0.045	1.74	30.0	8.8	0.00100	0.050	0.00002	0.051	0.081	0.00039	28.9	0.0002	0.00011	0.034	0.000005	0.000003	0.000030	0.00003	0.000006	0.00002	6.2	5.4	0.230	0.00002
% of Detected	97.1	100.0	100.0	18.2	100.0	100.0	6.1	100.0	84.8	100.0	100.0	100.0	9.1	100.0	100.0	100.0	45.5	90.9	51.5	100.0	100.0	33.3	100.0	30.3	57.6	100.0	24.2	12.1	48.5	36.4	27.3	9.1	100.0	100.0	100.0	16.7
DL							<2						<0.2															<0.00005	<0.0001			<0.0005				
3/23/2016	91.58	6.93	1513	-116.4	11.90	225	<2	1140	98	0.15	36.2	596	<0.09		206	70.4	0.00263	0.145	<0.00005	4.15	1.060		48.2	<0.002	0.00060	0.034	0.000020	<0.00002	0.000100	0.00014	<0.00002	<0.0001	11.8			
5/17/2016	90.84	7.09	1033	-100.1	11.80	214	<2	748	0.3	0.18	24.1	363	0.27		125	41.1	0.00285	0.105	0.00006	2.05	0.613		39.7	<0.002	0.00041	0.041	<0.00002	<0.00002	0.000050	0.00027	0.000022	<0.0001	11.1			
8/23/2016	92.28	7.15	763	-108.8	12.40	191	<0.4	495	2	0.20	15.1		<0.09		83.5	27.9	<0.002	0.108	0.00014	1.43	0.360		36.0	<0.002	0.00037	0.068	<0.00002	<0.00002	0.000060	<0.0002	<0.00002	<0.0002	13.7			
12/6/2016	92.95	7.42	571	-74.1	11.50	201	<0.4	342	38.4	0.20	9.86	101	<0.09		63.6	20.9	0.00315	0.086	0.00006	0.958	0.266		35.4	<0.002	0.00030	0.120	0.000009	<0.000004	0.000100	0.00039	0.000006	<0.0001	13.5			
2/21/2017	92.58	7.52	502	-63.1	11.80	201	0.20	296	3.5	0.18	8.08	68.6	0.10		51.3	15.0	0.002	0.071	0.00020	0.759	0.202		30.3	0.0004	0.00018	0.144	0.000010	0.000004	0.000030	0.00142	0.000010	0.00006	12.5			
6/13/2017	91.30	7.49	457	-117.9	12.50	198	2.50	263	3.3	0.18	6.95	48.2	0.05		42.4	13.4	0.002	0.075	0.00022	0.638	0.166		30.3	0.0002	0.00019	0.192	0.000006	0.0000025	0.000075	0.00021	0.000009	0.000015	12.7			
9/13/2017	91.90	7.58	419	-85.9	12.70	179	<0.1	256	1.8	0.18	6.01	32.4	<0.09		40.7	12.6	0.00375	0.068	0.00060	0.547	0.148		31.7	0.0020	0.00019	0.219	0.000008	<0.0001	0.000066	0.00013	0.000136	<0.00003	11.6			
11/7/2017	92.64	7.56	409	-89.2	11.90	191	< 5	251	0.8	0.20	5.82	29.1	< 0.09		38.7	12.0	0.001	0.102	0.00005	0.575	0.144		32.6	< 0.0004	0.00017	0.227	0.000009	< 0.000005	0.000068	0.00003	0.000009	< 0.00003	11.8			
2/7/2018	92.15	8.78	391	-94.4	10.20	191	< 5	226	1.0	0.18	5.56	24.2	< 0.09		36.7	11.0	0.00359	0.068	0.00008	0.464	0.129		29.4	0.0007	0.00016	0.238	0.000005	0.00003	0.000056	0.00010	0.000010	< 0.00003	12.0			
5/2/2018	89.77	7.76	378	-102.0	12.20	220	< 5	202	1.0	0.21	5.39	19.5	< 0.002	2.07	34.6	10.6	0.001	0.066	0.00012	0.516	0.134	0.00039	28.9	0.0020	0.00015	0.236	< 0.000004	< 0.000005	0.000097	< 0.00002	0.000022	< 0.00003	13.4		0.262	< 0.00001
7/11/2018	90.40	8.71	377	-118.0	12.30	192	< 5	209	0.7	0.21	5.27	18.4	< 0.002	1.86	36.8	11.1	0.00243	0.097	0.00008	0.495	0.129	0.00043	31.4	0.0008	0.00017	0.250	0.000008	< 0.000005	0.000097	0.00009	0.000009	< 0.00003	12.2		0.270	0.00002
10/17/2018	90.52	7.75	371	103.1	12.00	192	< 8	217	2.0	0.20	5.08	14.9	< 0.002	2.41	34.4	10.4	0.011	0.124	0.00009	0.503	0.120	0.0005	30.3	0.001	0.00017	0.256	< 0.00002	< 0.00001	0.00005	0.00004	< 0.00002	< 0.00003	12.0		0.263	< 0.0001
2/13/2019	89.30	7.96	357	99.2	10.70	181	< 8	208	< 0.4	0.19	4.70	10.2	< 0.002	2.17	33.4	10.1	0.002	0.070	0.00009	0.446	0.112	0.0005	31.6	< 0.0007	0.00014	0.266	< 0.00002	< 0.00001	< 0.00004	0.00040	< 0.00002	< 0.00003	14.0		0.264	< 0.0001
5/15/2019	89.15	8.19	354	-100.7	12.20	192	< 8	208	3.8	0.20	4.60	9.8	< 0.002	1.74	32.9	9.35	0.002	0.050	0.00002	0.411	0.110	0.0005	29.3	< 0.0007	0.00011	0.254	< 0.00002	< 0.00001	0.00007	0.00006	< 0.00002	< 0.00003	12.6		0.248	< 0.0001
8/21/2019	90.20	7.50	353	-134.9	14.50	191	< 8	220	4.5	0.18	4.73	9.3	< 0.002	2.05	32.4	9.77	0.060	< 0.1	< 0.001	0.451	0.108	< 0.002	30.7	< 0.004	0.0002	0.266	< 0.0001	< 0.00005	< 0.0002	< 0.0005	< 0.0002	< 0.0002	11.4		0.256	< 0.0005
11/20/2019	92.00	7.40	343	-121.2	11.60	190	< 8	206	1.0	0.18	4.50	7.7	< 0.002		32.7	9.63	< 0.005	0.061	< 0.0002	0.385	0.101		28.9	< 0.0007	0.00013	0.269	< 0.00002	< 0.00001	0.00010	< 0.0001	< 0.00005	< 0.00003	11.6			
2/19/2020	91.00	7.90	295	-98	11.70	180	< 8	216	0.8	0.19	4.49	6.7	< 0.002		32.7	9.72	< 0.005	0.059	< 0.0002	0.422	0.102		31.1	< 0.0007	0.00013	0.271	< 0.00002	< 0.00001	0.00009	< 0.0001	< 0.00005	< 0.00003	12.7			
4/29/2020	89.1	8.48	293	-127	11.90	176	< 8	212	0.3	0.17	4.51	5.5	< 0.002		32.7	9.8	< 0.005	0.053	< 0.0002	0.417	0.100		31.8	0.0051	0.00014	0.289	< 0.00002	< 0.00001	0.00008	< 0.0001	< 0.00005	< 0.00003	11.4			
CIP took over sampling																																				
9/22/2020	91.74	7.57	378	-120.9	12.72	173	-174.00	213	<4	0.21	4.38	7.6	<0.2		32.7	9.8	<0.05	0.063	<0.002	0.432	0.106		31.3	0.0200	<0.005	0.279	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	6.2			
12/1/2020	92.31	7.31	353	-85.0	10.39	170	-161.00	190	<4	0.21	4.30	6.8	<0.2		31.0	9.2	<0.05	0.050	<0.002	0.390	0.095		30.0	<0.02	<0.005	0.260	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	12.0			
1/14/2021	92.40	7.41	362	-26	11.41	180	-163	210	<2.2	0.19	4.30	6.7	<0.13		32	9.6	<0.034	0.067	<0.0017	0.4	0.099		31.0	<0.015	<0.00075	0.270	<0.00031	<0.00020	<0.00098	<0.0015	<0.00045	<0.00089	12.0			
4/6/2021	92.14	7.13	347	-16	12.56	180	-167	220	<1.0	0.18	4.30	6.5	<0.13	1.9	31	9.7	<0.047	0.083	<0.0035	0.48	0.098	<0.098	29.0	<0.0097	<0.0041	0.270	<0.00060	<0.00020	<0.00063	<0.0022	<0.0028	<0.0060	12.0	5.8	0.25	0.0040
8/11/2021	91.68	8.49	269	189	16.34	180	-172	180	2	0.21	4.30	6.8	<0.13	2	30	9.1	0.0370	0.074	0.01000	0.48	0.093	<0.0011	29.0	0.0160	<0.00075	0.270	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	13.0	6.2	0.23	<0.00020
10/14/2021	92.00	8.44	294	-83	13.77	170	-165	200	1	0.21	4.40	6.5	<0.13	2	32	9.9	<0.034	0.059	<0.0017	0.43	0.100	<0.0011	32.0	<0.015	<0.00075	0.290	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	12.0	5.7	0.26	<0.00020
3/10/2022	89.97	7.52	300	-56	13.87	170	-156	200	4.2	0.13	4.30	4.1	<0.13	1.9	31	9.1	<0.016	0.060	0.00270	0.51	0.092	<0.00061	31.0	<0.0029	<0.00028	0.290	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	13.0	6.2	0.23	<0.00047
4/8/2022	89.41	7.67	326	44	11.95	170	-141	180	6.9	0.24	4.10	5.6	<0.13	1.8	30	9.6	<0.016	0.080	<0.0011	0.44	0.093	<0.00061	31.0	<0.0029	<0.00028	0.280	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	12.0	5.8	0.24	<0.00047
7/15/2022	85.13	7.55	309	46	16.28	180.00	-139.00	130.00	7.00	0.19	4.10	4.50	<0.13	1.9	31	9.5	<0.034	<0.057	0.0019	0.051	0.098	<0.0011	33.0	<0.015	<0.00075	0.270	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	12.0	5.8	0.24	<0.00020
11/1/2022	91.89	7.51	326	35	13.48	170.00	-150.00	160.00	5.70	0.18	4.10	3.60	<0.13	1.9	32	9.1	<0.034	0.061	0.0018	0.68	0.098	<0.0011	30.0	<0.015	<0.00075	0.290	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	12.0	5.7	0.23	<0.00020
3/8/2023	92.26	7.27	350	-100	11.79	170.00	-142.00	170.00	2.50	0.13	3.70	3.40	<0.13	1.9	31	9.4	<0.034	0.06	<0.0017	0.37	0.090	0.0015	31.0	<0.015	0.00100	0.290	<0.00062	0.00025	<0.0025	<0.0015	<0.00045	0.0015	13.0	6.00	0.24	0.00096
4/13/2023	91.41	7.13	340	-98	12.75	82.00	-61.00	170.00	1.00	0.18	3.90	4.00	<0.13	1.8	31	8.8	<0.034	<0.057	<0.0017	0.35	0.091	<0.0011	29.0	<0.015	<0.00075	0.300	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	12.0	5.6	0.25	<0.00020
8/21/2023	91.85	7.08	337	-99	13.61	180.00	-213.00	120.00	3.70	0.17	3.80	3.00	<0.13	1.8	31	9.3	<0.034	0.063	<0.0017	0.38	0.090	<0.0011	31.0	<0.015	<0.00075	0.300	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	13.0	5.8	0.24	<0.00020
11/16/2023	92.87	8.10	349	-118	12.92	170.00	-195.00	170.00	4.10	0.15	4.10	3.70	<0.13	1.9	32	9.3	<0.034	0.058	<0.0017	0.41	0.100	<0.0011	30.0	<0.015	<0.00075	0.290	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	13.0	5.9	0.24	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																				
5/21/2024	90.70	7.10	328	-116	14.75	190.00	-186.00	290.00	8.10	0.17	3.70	2.70	<0.13	1.8	31	9.3	<0.034	0.058	<0.0017	0.36	0.081	<0.0011	31.0	<0.015	<0.00075	0.300	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	12.0	5.4	0.23	<0.00020

Record of Duplicates

3/8/2023	92.26	7.27	350	-100	12	170.00	-142.00	170.00	2.50	0.13	3.70	3.40	<0.13	1.9	31	9.4	<0.034	0.06	<0.0017	0.37	0.09	0.002	31	<0.015	0.001	0.29	<0.00062	0.00025	<0.0025	<0.0015	<0.00045	0.0015	13	6	0.24	0.00096
Duplicate	92.26	7.27	350	-100	12	160.00	-164.00	180.00	1.70	0.13	3.70	3.40	<0.13	1.8	30	9.1	<0.034	0.06	<0.0017	0.39	0.1	<0.0011	30	<0.015	<0.00075	0.28	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	13	5.8	0.23	<0.00020

MW-1507S

SAMPLING DATE	Depth to SWL ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
	Field Measurements																																			
Sample Size	34	33	33	33	33	32	33	33	33	33	33	32	33	18	33	33	33	33	33	33	33	18	33	33	33	33	33	33	33	33	33	33	33	12	18	18
Average of detected	30.89	5.38	7330	106.1	12.93	28.9	165.8	5288	2544.8	1.82	1776.0	1894.3	0.045	112.28	624.6	201.1	10.942	11.3	0.00099	55.3	18.9	0.0011	529.5	0.325	0.00562	0.0231	0.00498	0.00068	0.003992	0.277	0.00035	0.0205	32.0	14.3	3.517	0.00120
Std.Dev. Of detected	2.25	0.53	2140	51.5	1.44	31.6	138.7	1588	11600.0	1.19	646.0	462.8	0.000	54.52	153.6	47.6	9.270	3.5	0.00154	23.9	6.5	0.0010	222.6	0.117	0.00368	0.0052	0.01081	0.00147	0.005322	0.111	0.00054	0.0190	7.9	2.9	0.729	0.00223
Maximum of Detected	34.45	6.59	10858	215.0	16.36	83.0	486.0	8590	63800.0	4.89	2990.0	2800.0	0.045	202.00	908.0	285.0	35.200	18.3	0.00450	120.0	26.6	0.0021	1100.0	0.523	0.01850	0.0330	0.05650	0.00639	0.023000	0.447	0.00176	0.0820	45.6	19.0	4.590	0.00890
Median of Detected	31.25	5.32	7839	101.7	12.68	12.0	195.0	5760	37.5	1.71	1850.0	1765.0	0.045	114.50	652.5	198.0	9.470	11.5	0.00020	46.6	22.0	0.0012	530.0	0.363	0.00464	0.0231	0.00269	0.00027	0.001495	0.300	0.00013	0.0162	34.2	14.0	3.750	0.00057
Minimum of Detected	26.55	4.60	3030	-3.0	9.70	0.5	-103.0	2100	3.0	0.11	620.0	1000.0	0.045	34.00	330.0	110.0	0.250	4.6	0.00006	31.2	1.4	0.0001	190.0	0.087	0.00089	0.0106	0.00071	0.00003	0.000200	0.067	0.00008	0.0009	10.6	11.0	2.300	0.00024
% of Detected	96.8	100.0	100.0	96.7	100.0	51.7	83.3	100.0	100.0	100.0	100.0	100.0	6.7	100.0	100.0	100.0	100.0	96.7	43.3	100.0	96.7	16.7	96.7	100.0	100.0	100.0	83.3	60.0	80.0	100.0	30.0	63.3	100.0	100.0	100.0	77.8
DL							<2						<0.2															<0.00005	<0.0001			<0.0005				
3/23/2016	30.66	5.69	2269	-77.1	12.0	54	<2	2120	120	1.13	5.3	1410	<0.09		271	186	2.330	0.1	0.00034	33.9	13.1		14.8	0.182	0.00297	0.0139	0.00093	0.00008	0.000400	0.150	0.00004	0.0037	32.0			
5/17/2016	30.29	5.30	2608	38.8	11.7	11	<2	2680	68.6	2.00	5.1	1800	<0.09		247	199	7.430	0.1	0.00020	24.0	12.6		13.9	0.344	0.00363	0.0136	0.00247	0.00021	0.000400	0.237	<0.00001	0.0093	35.4			
8/23/2016	33.10	5.69	2087	21.6	16.9	54	<0.4	2000	1240	0.55	8.8		<0.09		218	156	7.620	0.1	0.00018	28.1	12.0		16.2	0.258	0.00241	0.0122	0.00188	0.00023	0.000200	0.192	0.000129	0.005	24.6			
12/6/2016	31.94	5.10	7590	106.6	10.6		<0.4	5920	63800	4.89	1410	1540	<0.09		673	266	0.565	11.9	0.00057	37.3	26.3		345.0	0.457	0.01850	0.0106	0.05650	0.00639	0.011600	0.392	0.001760	0.082	10.6			
2/21/2017	29.66	4.96	7542	156.3	12.1	1	201	4900	3920	2.23	1670	1700	0.05		674	152	26.700	11.0	0.00017	31.2	22.2		324.0	0.489	0.00483	0.0131	0.00475	0.00045	0.000478	0.410	0.000218	0.0218	26.5			
6/13/2017	28.90	4.98	10304	85.5	13.8	1	354	7300	389	2.35	2740	2410	0.05		908	179	35.200	17.4	0.00029	39.6	25.7		589	0.523	0.00637	0.0235	0.00605	0.00132	0.001290	0.447	0.000369	0.0317	40.2			
9/13/2017	31.80	4.83	10858	146.2	14.7	1	9	8590	1420	3.79	2990	2210	<0.09		865	196	29.500	18.3	0.00020	40.9	23.8		637.0	0.482	0.00865	0.0236	0.00489	0.0001	0.001230	0.426	0.000219	0.041	35.8			
11/7/2017	32.08	5.02	9187	117.5	11.7	< 1	315	6170	430	2.89	2640	1810	< 0.09		799	191	23.700	17.6	0.00006	42.1	23.4		567.0	0.426	0.00764	0.0231	0.00512	0.00026	0.000565	0.437	0.000110	0.0379	34.2			
2/7/2018	30.42	5.60	7608	137.2	9.7	< 1	486	5440	2020	2.72	1940	1690	< 0.09		699	159	18.200	14.3	< 0.00005	38.6	19.9		436.0	0.328	0.00631	0.0220	0.00347	0.00054	0.000625	0.333	0.000125	0.0257	22.1			
5/2/2018	26.67	4.99	8960	121.9	13.3	< 1	174	5930	1310	3.11	2350	2170	< 0.002	184.00	742	195	18.500	13.2	0.00014	39.7	22.7	0.000	497.0	0.220	0.00362	0.0188	0.00210	0.0003	0.000348	0.274	0.000133	0.0144	35.1		4.22	0.000673
7/11/2018	29.15	5.85	9440	74.0	12.6	< 1	228	7400	153	3.51	2560	2470	< 0.002	202.00	881	285	19.300	15.9	0.00010	40.3	23.0	< 0.0001	699.0	0.383	0.00532	0.0238	0.00408	0.00014	0.000495	0.375	0.000080	0.0239	41.9		4.59	0.00101
10/17/2018	29.39	5.38	7300	124.5	12.4	< 3	318	5410	1240	2.65	1950	1720	< 0.002	142.00	602	200	13.600	11.5	0.00030	39.8	19.3	< 0.002	446.0	0.365	0.00580	0.0240	0.00271	0.00028	0.000400	0.327	0.000100	0.0208	32.1		3.36	0.001
2/13/2019	26.55	6.50	8680	102.6	11.3	< 3	329	6290	980	2.96	2370	2090	< 0.002	158.00	650	226	9.440	10.2	0.00020	52.4	22.8	< 0.002	632.0	0.299	0.00353	0.0308	0.00222	0.0002	0.000200	0.289	< 0.0001	0.0133	34.3		4.19	0.0007
5/15/2019	28.00	5.95	9220	80.8	12.4	< 3	195	6300	78	2.21	2180	2200	< 0.002	168.00	749	221	14.000	11.4	< 0.0001	45.2	24.8	< 0.002	529.0	0.383	0.00349	0.0262	0.00302	0.00009	0.000300	0.334	< 0.0001	0.0162	45.6		4.23	0.0006
8/21/2019	30.15	4.80	9080	81.2	14.3	< 5	280	6540	126	1.89	2210	2380	< 0.002	164.00	655	225	13.400	12.9	< 0.001	43.0	22.3	< 0.002	544.0	0.384	0.00466	0.0269	0.00269	0.00008	0.000900	0.341	< 0.0002	0.0211	35.1		4.12	0.0009
11/20/2019	33.15	4.60	8560	98.0	11.9	< 5	215	6360	19	2.43	2100	2050	< 0.002		723	230	13.800	13.1	< 0.0002	51.5	21.6		582.0	0.318	0.00462	0.0216	0.00266	0.00003	0.001180	0.335	< 0.00005	0.0135	40.4			
2/19/2020	30.70	5.02	5570	100.7	12.1	< 5	153	4750	9	1.68	1510	1670	< 0.002		667	262	9.310	9.0	0.00020	49.0	23.4		537.0	0.304	0.00333	0.0199	0.00197	0.00008	0.007250	0.298	< 0.00005	0.0089	34.2			
4/29/2020	27.90	5.61	8390	61.0	12.5	< 5	222	7000	68	2.10	2490	2070	< 0.002		702	205	13.200	9.8	< 0.0002	47.1	21.4		629.0	0.401	0.00352	0.0300	0.00195	0.00006	0.009540	0.343	< 0.00005	0.0095	36.1			
CIP took over sampling																																				
9/22/2020	32.24	4.87	10254	99.6	13.01	<5	256	5930	39	1.73	2370	2450	<0.2		748	260	10.8	14.2	<0.002	58.5	26.6		751.0	0.415	0.00301	0.0238	0.00295	<0.001	0.001710	0.309	<0.001	<0.005	18.1			
12/1/2020	33.95	4.69	8290	144.0	11.71	<5	210	5600	28	1.60	1800	2100	<0.2		640	260	10.0	13.0	<0.002	54.0	23.0		670.0	0.440	0.00270	0.0200	0.00280	<0.001	0.003400	0.310	<0.001	0.0009	37.0			
1/14/2021	33.09	4.96	6720	135	11.79	<2.6	130	4000	18	1.3	1500	1700	<0.13		520	200	7.00	12.0	<0.0017	50	18		530.0	0.370	0.00200	0.020	0.00230	0.0009	0.0074	0.250	<0.00045	0.00093	34.0			
4/6/2021	32.91	4.99	5790	182	12.92	4.2	140	3800	3	0.96	1200	1400	<0.13	97	410	160	4.10	10.0	<0.0035	44	13	<0.0049	400.0	0.280	0.00830	0.018	0.00210	0.00075	0.0095	0.210	<0.0028	<0.0060	31.0	14.0	2.4	0.0089
8/11/2021	32.22	6.18	4860	204	15.15	12	84	4000	120	0.87	1200	1400	<0.13	99	400	160	9.50	11.0	0.00450	43	1.4	<0.0011	470.0	0.270	0.00270	0.019	0.00150	<0.00020	0.0034	0.190	<0.00045	<0.00089	37.0	17.0	2.6	0.00045
10/13/2021	34.45	6.03	3880	97	14.19	39	57	3300	21	0.69	960	1400	<0.13	76	330	130	1.40	8.8	<0.0017	43	11	0.0012	330.0	0.180	0.00300	0.020	0.00071	<0.00020	<0.0025	0.150	<0.00045	<0.00089	30.0	14.0	2.3	0.00024
3/10/2022	28.14	5.57	6070	53	12.76	36	82	4500	14	0.56	1200	1700	<0.13	94	480	180	2.2	10.00	<0.0011	46	16	<0.00061	650.0	0.250	0.00340	0.032	0.00087	<0.00022	<0.0015	0.200	<0.00017	<0.00074	34.0	16.0	2.8	0.00049
4/8/2022	28.29	5.25	8070	215	12.16	6.00	120.00	6200	13.00	1.20	1700	2400	<0.13	130	650	260	6.2	13.00	<0.0011	59	22	<0.00061	890	0.370	0.00320	0.033	0.00150	<0.00022	0.0017	0.280	<0.00017	<0.00074	39.0	18.0	3.8	0.00052
7/15/2022	32.55	5.66	8370	119	16.36	2.70	120.00	6300	26.00	1.60	1900	2700	<0.13	150	660	270	8.5	13.00	0.0022	59	25	<0.0011	1100	0.400	0.00089	0.027	0.00260	<0.00020	0.0058	0.300	<0.00045	0.00095	41.0	19.0	3.9	0.00047
10/12/2022	33.01	5.23	8450	160	14.33	2.60	210.00	6300	36.00	1.40	2000	2800	<0.13	140	630	240	7.8	14.00	0.0039	49	22	0.0021	970	0.360	0.00180	0.020	0.00290	<0.00020	0.0230	0.300	<0.00045	0.0050	35.0	16.0	3.5	0.00054
3/8/2023	32.56	5.41	4880	82	12.51	30.00	220.00	3100	6.10	0.25	1100	1400	<0.13	55	510	160	0.92	6.30	<0.0017	120	12	<0.0011	270	0.170	0.01000	0.019	<0.00062	0.0003	<0.0025	0.100	<0.00045	<0.00089	26.0	12.0	3.9	0.00025
4/13/2023	30.16	5.44	4610	72	13.29	62.00	-49.20	3200	22.00	0.11	980	1300	<0.13	47	500	150	0.43	5.60	<0.0017	120	11	<0.0011	230	0.150	0.01200	0.023	<0.00062	<0.00020	0.0035	0.100	<0.00045	<0.00089	23.0	11.0	4.1	<0.00020
8/21/2023	32.52	5.49	4010	28	13.64	83.00	-103.00	2400	6.40	0.18	840	1300	<0.13	36	470	140	0.28	4.60	<0.0017	110	9.6	<0.0011	190	0.120	0.01000	0.023	<0.00062	<0.00020	<0.0012	0.075	<0.00045	<0.00089	22.0	11.0	3.7	<0.00020
11/16/2023	34.02	6.59	3030	-3	13.31	79.00	-70.60	2100	7.10	0.20	620	1000	<0.13	34	350	110	0.25	5.60	<0.0017	73	7.9	<0.0011	190	0.087	0.00790	0.025	<0.00062	<0.00020	<0.0012	0.067	<0.00045	<0.00089	23.0	11.0	2.5	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																				
5/21/2024	30.10	5.90	4330	1	15.38	75.00	-75.60	3600	23.00	0.44	800	1600	<0.13	45	450	160	0.46	6.00	<0.0017	92	12	<0.0011	310	0.140	0.00760	0.031	<0.00062	<0.00020	<0.0012	0.100	<0.00045	<0.00089	25.0	12.0	3.1	<0.00020

Record of Duplicates

4/8/2022						6.00	120.00	6200.00	13.00	1.20	1700.00	2400.00	<0.13	130	650	260	6.2	13.00	<0.0011	59	22	<0.00061	890	0.37	0.0032	0.033	0.0015	<0.00022	0.0017	0.28	<0.00017	<0.00074	39	18	3.8	0.00052
Duplicate						6.20	130.00	5700.00	17.00	1.20	1900.00	2600.00	<0.13	130	650	260	5.4	13.00	<0.0011	60	22	<0.00061	880	0.36	0.0035	0.032	0.0015	<0.00022	<0.0015	0.28	<0.00017	<0.00074	38	18	3.8	0.00051
3/8/2023	32.56	5.41	4880	82	13	30.00	220.00	3100.00	6.10	0.25	1100.00	1400.00	<0.13	55	510	160	0.92	6.30	<0.0017	120	12	<0.0011	270	0.17	0.01	0.019	<0.00062	0.0003	<0.0025	0.1	<0.00045	<0.00089	26	12	3.9	0.00025
Duplicate	32.56	5.41	4880	82	13	33.00	210.00	3000.00	7.90	0.23	1000.00	1300.00	<0.13	53	490	150	0.89	5.90	<0.0017	110	12	<0.0011	250	0.16	0.0099	0.018	<0.00062	0.00026	<0.0025	0.1	<0.00045	<0.00089	24	11	3.7	0.00021

MW-1701

SAMPLING DATE	Depth to SWL ft	Field Measurements pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L
Sample Size	29	28	28	28	28	28	28	28	28	28	28	28	28	18	28	28
Average of detected	58.27	6.77	1658.7	-15.0	12.9	157.1	-131.0	1257.3	29.1	0.13	88.9	682.1	0.073	7.78	197.3	56.3
Std.Dev. Of detected	1.53	0.40	997.0	51.1	0.9	24.8	69.2	659.9	17.5	0.02	175.0	302.3	0.039	9.29	31.0	10.8
Maximum of Detected	61.47	7.89	6720.0	160.0	14.6	190.0	2.5	4600.0	69.8	0.18	980.0	2200.0	0.100	45.00	350.0	110.0
Median of Detected	58.27	6.70	1496.5	-33.0	12.8	160.5	-120.5	1150.0	25.0	0.13	58.0	620.0	0.073	5.56	190.5	54.9
Minimum of Detected	55.40	6.22	1160.0	-64.1	11.4	54.0	-326.0	860.0	8.0	0.09	29.4	540.0	0.045	5.10	180.0	49.0
% of Detected	93.1	100.0	100.0	17.9	100.0	100.0	3.6	100.0	100.0	100.0	100.0	100.0	7.1	100.0	100.0	100.0
DL							<2						<0.2			
6/14/2017	57.15	6.77	1486	-42.9	12.9	183	2.5	1150	15.4	0.1	29.4	832	0.0450		191	52.8
9/13/2017	58.70	6.88	1514	-9.2	13.3	166	<0.1	1220	42.2	0.15	36.9	659	0.1000		188	53.5
11/8/2017	59.60	6.64	1493	-13.9	12.6	163	< 5	1150	17.0	0.10	40.2	659	< 0.09		202	57.2
2/6/2018	59.82	6.54	1511	-21.0	12.0	172	< 5	1150	51.6	0.10	40.8	681	< 0.09		201	55.6
5/1/2018	57.03	6.60	1480	-45.1	13.0	175	< 5	1140	18.2	0.16	44.9	701	< 0.002	6.09	195	55.5
7/10/2018	58.27	7.21	1490	-62.0	13.1	156	< 5	1150	18.5	0.15	45.5	660	< 0.002	5.51	192	54.9
10/16/2018	58.85	6.98	1500	-45.0	12.6	173	< 8	1190	28.4	0.14	47.8	613	< 0.002	6.22	203	57.7
2/12/2019	56.91	7.20	1510	-45.2	12.2	166	< 8	1160	59.5	0.12	54.0	641	< 0.002	6.255	206	57.8
5/14/2019	57.12	7.23	1500	-57.8	12.6	169	< 8	1210	47.9	0.14	55.0	642	< 0.002	5.63	195	52.9
8/20/2019	59.10	6.40	1450	-62.1	13.5	153	< 8	1230	58.3	0.12	56.8	630	< 0.002	5.4	190	53.3
11/19/2019	59.59	7.40	1460	-37.7	12.4	169	< 8	1190	52.8	0.12	56.2	595	< 0.002		199	56.9
2/18/2020	57.97	6.68	1260	-37.5	12.4	171	< 8	1155	69.8	0.13	58.6	628	< 0.002		193	57.2
4/29/2020	56.82	7.06	1260	-64.1	12.7	161	< 8	1170	41.0	0.11	58.7	625	< 0.002		207	57.6
CIP took over sampling																
9/22/2020	58.80	6.46	1619	-21.4	13.49	130	-103	1080	35.0	0.121	58.4	604	<0.2		193	54.9
12/1/2020	60.18	6.27	1460	-5.0	11.38	130	-116	860	9.0	0.14	58.0	610	<0.2		190	56.0
1/28/2021	61.47	6.39	1500	-9	11.38	150	-93.6	1100	8	0.13	58	620	<0.13		190	55
4/2/2021	60.15	6.31	1490	6	11.55	160	-119	1100	9	0.18	57	610	<0.13	5.2	180	53
8/20/2021	58.66	7.89	1160	69	14.19	150	<5.0	1100	26	0.15	57	620	<0.13	5.6	180	53
10/12/2021	55.59	7.16	1550	-37	14.43	150	-127	1100	9	0.14	58	620	<0.13	5.7	190	56
3/3/2022	57.40	6.32	1430	-5	12.16	140	-110	1100	18	0.091	66	610	<0.13	5.1	190	52
4/7/2022	56.68	6.60	1400	50	13.01	150	-112	1200	16	0.15	61	580	<0.13	5.2	180	55
8/1/2022	57.53	6.90	1460	90	14.57	150	-122	1300	20	0.11	67	610	<0.13	5.4	180	51
10/28/2022	N/A	6.72	6720	160	13.92	54	<5.0	4600	24	0.11	980	2200	<0.13	45	350	110
3/9/2023	59.07	6.56	1510	-35	12.26	160	-128	1000	18	0.1	68	570	<0.13	5.8	190	54
4/14/2023	56.88	6.39	1540	-37	13.34	190	-156	1100	13	0.094	68	600	<0.13	5.5	180	49
8/22/2023	55.40	6.22	1520	-31	13.49	160	-147	1100	31	0.13	70	580	<0.13	5.6	190	52
12/4/2023	60.71	7.14	1640	-12	12.22	170	-326	1100	28	0.11	66	540	<0.13	5.5	180	50
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																
5/23/2024	57.80	6.75	1530	-60	13.87	180	-177	1100	29	0.16	71	560	<0.13	5.4	200	53

SAMPLING DATE	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	28	27	28	28	28	18	28	28	28	28	28	28	27	28	28	28	28	12	18	18
Average of detected	0.0106	0.721	0.00014	17.2	1.88	0.00019	88.7	0.0032	0.00046	0.016	0.000032	0.000140	0.000137	0.00127	0.00004	0.000039	17.1	8.3	1.85	0.00246
Std.Dev. Of detected	0.0214	2.454	0.00006	3.3	2.63	0.00001	174.7	0.0060	0.00011	0.001	0.000016	0.000260	0.000125	0.00161	0.00003	0.000023	1.9	0.5	0.16	0.00346
Maximum of Detected	0.0700	13.000	0.00026	25.7	15.00	0.00019	980.0	0.0200	0.00059	0.019	0.000075	0.000530	0.000500	0.00720	0.00008	0.000070	19.0	8.9	2.09	0.00490
Median of Detected	0.0022	0.250	0.00012	17.9	1.43	0.00019	55.8	0.0010	0.00046	0.016	0.000030	0.000014	0.000079	0.00075	0.00002	0.000035	17.2	8.5	1.89	0.00246
Minimum of Detected	0.0010	0.199	0.00008	12.5	1.10	0.00018	48.7	0.0005	0.00030	0.013	0.000007	0.000003	0.000063	0.00053	0.00001	0.000015	9.5	7.1	1.40	0.00001
% of Detected	35.7	100.0	32.1	100.0	96.4	11.1	100.0	35.7	46.4	100.0	42.9	14.3	44.4	57.1	25.0	14.3	100.0	100.0	100.0	11.1
DL												<0.00005	<0.0001			<0.0005				
6/14/2017	0.0010	0.262	0.00020	12.5	1.1		55.3	0.0005	0.00059	0.017	0.000025	0.000003	0.00006	0.00136	0.00002	0.000015	17.1			
9/13/2017	0.0023	0.253	0.00008	16.0	1.35		53.4	0.0027	0.00059	0.019	0.000032	<0.0001	0.00007	0.00118	0.00006	<0.00003	16.6			
11/8/2017	0.0023	0.249	0.00008	18.3	1.49		57.3	0.0007	0.00056	0.017	0.000036	< 0.000005	0.000078	0.00162	0.00001	< 0.00003	16.3			
2/6/2018	0.0020	0.240	0.00010	18.2	1.49		56.2	0.001	0.00057	0.017	0.000027	0.000020	0.000076	0.00094	0.000020	< 0.00003	16.2			
5/1/2018	0.0022	0.252	0.00012	18.1	1.51	0.00018	56.2	0.0022	0.00046	0.016	0.000007	0.000008	0.00008	0.00056	0.000052	0.00003	16.6		1.99	< 0.00001
7/10/2018	0.0010	0.241	0.00015	16.2	1.35	0.00019	56.1	0.0005	0.00046	0.016	0.000036	< 0.000005	0.00007	0.00072	0.0001	< 0.00003	17.1		1.93	0.00001
10/16/2018	0.0171	0.276	0.00018	17.9	1.46	< 0.0004	58.8	0.002	0.00046	0.016	0.000030	< 0.00001	0.0002	0.0007	< 0.00002	< 0.00003	15.8		2.04	< 0.0001
2/12/2019	0.0061	0.271	0.00026	25.7	1.5	< 0.0004	58.2	0.001	0.00057	0.016	0.000075	< 0.00001	0.00015	0.00112	0.000080	0.00004	17.4		2.085	< 0.0001
5/14/2019	0.0020	0.216	0.00008	17.8	1.47	< 0.0004	51.4	0.0009	0.00030	0.016	0.000030	< 0.00001	0.00008	0.0007	< 0.00002	< 0.00003	18.1		1.9	< 0.0001
8/20/2019	0.0700	0.200	< 0.001	17.2	1.35	< 0.002	51.9	< 0.004	0.00040	0.016	< 0.0001	< 0.00005	0.00050	0.0007	< 0.0002	< 0.0002	16.0		1.87	< 0.0005
11/19/2019	< 0.005	0.229	< 0.0002	18.0	1.43		48.7	< 0.0007	0.00032	0.016	0.000020	< 0.00001	0.0002	0.00072	< 0.00005	< 0.00003	15.1			
2/18/2020	< 0.005	0.199	< 0.0002	19.7	1.555		51.8	< 0.0007	0.00037	0.015	0.000030	< 0.00001	0.000085	0.00073	< 0.00005	< 0.00003	17.3			
4/29/2020	< 0.005	0.212	< 0.0002	18.6	1.5		55.5	< 0.0007	0.00037	0.015	0.000030	< 0.00001		0.00076	< 0.00005	0.00007	16.1			
CIP took over sampling																				
9/22/2020	<0.05	0.285	<0.002	25.5	1.67		50.9	0.02	<0.005	0.016	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	9.5			
12/1/2020	<0.05	0.300	<0.002	19.0	1.6		53.0	<0.02	<0.005	0.016	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	19.0			
1/28/2021	<0.034	0.26	<0.0017	19	1.5		52	<0.015	<0.00075	0.016	<0.00031	<0.00020	<0.00098	<0.0015	<0.00045	<0.00089	19			
4/2/2021	<0.047		<0.0035	13	1.4	<0.0049	50	<0.0097	<0.0041	0.015	<0.00060	0.00053	<0.00063	<0.0022	<0.0028	<0.0060	19	8.4	1.8	0.0049
8/20/2021	<0.034	0.24	<0.0017	20	1.4	<0.0011	54	<0.015	<0.00075	0.015	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	18	8.6	1.9	<0.00020
10/12/2021	<0.034	0.24	<0.0017	18	1.5	<0.0011	55	<0.015	<0.00075	0.016	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	19	8.9	2	<0.00020
3/3/2022	<0.016	0.23	<0.0011	17	1.3	<0.00061	56	<0.0029	<0.00028	0.016	<0.00027	<0.00022	<0.0015	0.00079	<0.00017	<0.00074	19	8.8	1.8	<0.00047
4/7/2022	<0.016	0.23	<0.0011	18	1.3	<0.00061	55	<0.0029	<0.00028	0.016	<0.00027	<0.00022	<0.0015	0.00053	<0.00017	<0.00074	18	8.5	1.7	<0.00047
8/1/2022	<0.034	0.25	<0.0017	16	1.2	<0.0011	56	<0.015	<0.00075	0.015	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	19	8.7	1.7	<0.00020
10/28/2022	<0.034	13	<0.0017	14	15	<0.0011	980	<0.015	<0.00075	0.013	<0.00062	<0.00020	<0.0025	0.0072	<0.00045	<0.00089	15	7.1	1.4	<0.00020
3/9/2023	<0.034	0.27	<0.0017	14	1.2	<0.0011	64	<0.015	<0.00075	0.016	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	18	8.3	1.8	<0.00020
4/14/2023	<0.034	0.28	<0.0017	14	1.2	<0.0011	59	<0.015	<0.00075	0.016	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	17	8.1	1.9	<0.00020
8/22/2023	<0.034	0.27	<0.0017	14	1.2	<0.0011	63	<0.015	<0.00075	0.016	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	18	8.6	1.9	<0.00020
12/4/2023	<0.034	0.24	<0.0017	13	1.1	<0.0011	62	<0.015	<0.00075	0.015	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	17	7.8	1.8	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																				
5/23/2024	<0.034	0.28	<0.0017	13	1.1	<0.0011	64	<0.015	<0.00075	0.017	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	18	8.2	1.8	<0.00020

Record of Duplicates

SAMPLING DATE	Depth to SWL	pH	Cond	Redox	Temperature	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg
2/12/2019	56.91	7.2	1510	-45.20	12.20	164	< 8	1180	60	0.13	53.0	635	< 0.002	6.29	207	58.2
Duplicate						167	< 8	1140	59	0.1	54.90	646	< 0.002	6.22	205	57.4
2/18/2020	57.97	6.68	1260	-38	12.40	172	< 8	1160	69.5	0.13	58.6	628	< 0.002		193	57.1
Duplicate						169	< 8	1150	70	0.13	58.60	628	< 0.002		193	57.2
8/22/2023	55.40	6.22	1520	-31	13.49	160	-147	1100	31	0.13	70.00	580	<0.13	5.60	190	52.0
Duplicate						160	-160	1100	31	0.13	69.00	600	<0.13	5.70	190	52.0

SAMPLING DATE	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
2/12/2019	0.00631	0.273	0.00027	25.9	1.50	< 0.0004	58.5	0.001	0.00055	0.0154	0.00008	< 0.00001	0.00020	0.00109	0.00008	< 0.00003	17.1		2.10	< 0.0001
Duplicate	0.00597	0.269	0.00025	25.4	1.5	< 0.0004	57.8	0.0010	0.00059	0.0168	0.00007	< 0.00001	0.0001	0.00114	0.00008	0.00004	17.6		2.07	< 0.0001
2/18/2020	< 0.005	0.201	< 0.0002	19.6	1.55		51.8	< 0.0007	0.00038	0.015	0.00003	< 0.00001	0.00007	0.00071	< 0.00005	< 0.00003	17.5			
Duplicate	< 0.005	0.197	< 0.0002	19.7	1.56		51.7	< 0.0007	0.00036	0.015	0.00003	< 0.00001	0.0001	0.0008	< 0.00005	< 0.00003	17.0			
8/22/2023	<0.034	0.270	<0.0017	14.0	1.2	<0.0011	63.0	<0.015	<0.00075	0.016	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	18.0	8.6	1.9	<0.00020
Duplicate	<0.034	0.270	<0.0017	14.0	1.2	<0.0011	63.0	<0.015	<0.00075	0.016	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	18.0	8.6	1.9	<0.00020

MW-1702

SAMPLING DATE	Field Measurements: Depth to SWL ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	29	28	28	28	28	28	28	28	28	28	28	28	28	18	28	28	28	28	28	28	28	18	28	28	28	28	28	28	28	28	28	28	28	12	18	18
Average of detected	15.26	6.02	5448.9	68.2	13.9	65.9	-70.7	4201.4	17.0	0.15	969	2025	<0.2	37.8	384	152.8	0.150	10.5	0.0007	25.4	12.7	0.0002	721.5	0.0100	0.0012	0.0139	0.00009	0.00014	0.0004	0.0106	0.00012	0.0009	15.3	6.9	1.357	0.000585
Std.Dev. Of detected	2.09	0.48	2232.3	35.3	1.6	33.7	120.6	1817.8	11.4	0.05	497	730	NA	12.8	134	73.7	0.127	5.0	0.0010	16.4	5.6	0.0000	378.7	0.0034	0.0004	0.0026	0.00019	0.00023	0.0004	0.0060	0.00007	0.0004	2.7	0.6	0.443	0.000327
Maximum of Detected	20.46	7.28	8740.0	165.0	16.8	180.0	78.2	6270.0	54.0	0.22	1670	3100	<0.2	51.7	615	267.0	0.450	17.0	0.0035	54.7	21.8	0.0002	1200.0	0.0166	0.0022	0.0181	0.00062	0.00092	0.0014	0.0329	0.00022	0.0017	19.1	8.2	1.900	0.001300
Median of Detected	15.20	5.85	5620.0	65.2	13.6	57.4	-21.7	4680.0	16.0	0.17	1085	2300	<0.2	41.0	423	171.5	0.109	11.7	0.0003	26.1	13.0	0.0002	755.5	0.0100	0.0012	0.0144	0.00002	0.00009	0.0003	0.0094	0.00008	0.0009	14.0	6.7	1.500	0.000500
Minimum of Detected	11.12	5.50	1490.0	14.8	11.4	32.3	-369.0	1000.0	3.6	0.05	69	590	<0.2	5.7	150	32.0	0.023	0.3	0.0001	2.2	1.2	0.0001	59.0	0.0032	0.0004	0.0086	0.00001	0.00004	0.0001	0.0040	0.00004	0.0003	7.2	6.0	0.560	0.000210
% of Detected	93.1	100.0	100.0	100.0	100.0	100.0	7.1	100.0	100.0	78.6	100.0	100.0	0.0	100.0	100.0	100.0	64.3	92.9	46.4	100.0	96.4	11.1	96.4	60.7	82.1	100.0	35.7	46.4	46.4	92.9	32.1	53.6	100.0	100.0	100.0	50.0
DL							<2						<0.2															<0.00005	<0.0001			<0.0005				
6/14/2017	17.13	5.86	2454	62.2	13.4	35.0	<5	2040	26.2	<0.5	244	1370	<0.09		255	113	0.096	1.17	0.0008	37.6	5.82		60.3	0.010	0.0012	0.0141	0.00002	0.00004	0.0003	0.0092	0.00007	0.0004	18.1			
9/13/2017	17.61	5.72	2538	105.4	15.8	32.3	<0.1	1870	4.5	0.18	283	1110	<0.09		271	129	0.090	1.4	0.0001	42.2	5.91		85.9	0.010	0.0013	0.0142	0.00002	<0.0001	0.0004	0.0090	0.00008	0.0004	18.6			
11/8/2017	17.60	5.76	2502	91.2	15.6	34.9	78.20	1810	4.7	0.10	348	976	< 0.09		255	121	0.075	1.6	0.0002	41.3	5.58		97.9	0.009	0.0013	0.0145	0.00002	0.00004	0.0002	0.0085	0.00004	0.0003	18.9			
2/6/2018	17.65	5.64	4037	75.5	13.3	32.9	< 5	2880	3.6	0.10	687	1400	< 0.09		353	159	0.123	3.6	0.0001	49.4	7.41		203.0	0.011	0.0011	0.0181	0.00002	0.00006	0.0001	0.0115	0.00008	0.0006	19.1			
5/1/2018	15.19	5.59	5620	73.5	12.8	39.2	< 5	4660	20.2	0.19	978	2180	< 0.002	22.1	575	248	0.401	7.8	0.0003	54.7	18.9	0.000	380.0	0.016	0.0015	0.0164	0.00001	0.00009	0.0009	0.0176	0.00014	0.0010	19.0		1.73	0.000548
7/10/2018	15.60	6.11	6190	34.5	14.9	48.2	< 5	4700	4.8	0.22	1070	2510	< 0.002	24.3	496	253	0.286	7.4	0.0003	49.0	17.4	0.000	434.0	0.017	0.0015	0.0147	0.00005	0.00009	0.0002	0.0168	0.00022	0.0009	18.8		1.6	0.000546
10/16/2018	15.64	5.91	7160	66.1	16.4	58.7	< 8	5540	15.2	0.20	1370	2330	< 0.002	30.7	554	267	0.138	11.4	0.0002	51.4	16.1	< 0.002	669.0	0.010	0.0015	0.0166	< 0.0001	0.00008	0.0004	0.0165	< 0.0001	0.0012	18.5		1.64	0.0009
2/12/2019	14.65	6.28	8210	40.6	12.8	79.3	< 8	6270	12.6	0.20	1650	2680	< 0.002	41	615	256	0.245	12.5	0.0002	42.8	20.8	< 0.002	1130.0	0.010	0.0012	0.0154	< 0.0001	0.0001	0.0014	0.0329	< 0.0001	0.0017	17.1		1.89	0.0005
5/14/2019	15.20	6.53	7870	37.2	12.4	72.6	< 8	6270	13.7	< 0.07	1470	2710	< 0.002	40.9	538	213	0.235	10.5	0.0002	33.5	19.2	< 0.0004	724.0	0.013	0.0010	0.0138	0.00003	0.00012	0.0002	0.0145	0.00020	0.0011	15.8		1.6	0.0004
8/20/2019	15.31	5.5	7540	14.8	16.3	84.3	< 8	6200	23.3	0.20	1385	2595	< 0.002	51.7	426	216	0.139	12.3	< 0.001	34.0	17.7	< 0.002	755.5	0.010	0.0015	0.0158	< 0.0001	0.000065	0.0005	0.0122	< 0.0002	0.0013	14.0		1.68	0.0005
11/19/2019	14.89	6.8	7420	27.8	15.8	85.0	< 8	5930	16.7	0.20	1440	2170	< 0.002		467	198	0.051	12.4	< 0.0002	28.4	15.3		833.0	0.006	0.0013	0.0149	< 0.00002	0.00005	0.0003	0.0097	< 0.00005	0.0008	13.5			
2/18/2020	14.18	5.88	7060	37.9	12.2	84.3	< 8	5960	9.5	0.20	1670	2320	< 0.002		479	184	0.095	14.1	< 0.0002	31.4	21.8		1140.0	0.008	0.0011	0.0148	0.00002	0.00009	0.0001	0.0106	< 0.00005	0.0010	13.0			
4/29/2020	13.93	6.25	5620	17.4	12.8	66.8	< 8	6270	18.3	0.10	1430	2690	< 0.002		526	191	0.170	11.4	0.0003	23.9	20.3		1120.0	0.011	0.0010	0.0134	0.00004	0.00011	0.0002	0.0120	0.00006	0.0009	14.0			
CIP took over sampling																																				
9/22/2020	15.27	5.73	8727	64.2	16.81	81.8	-21.7	2340	18.0	0.16	1440	2670	<0.2		441	185	<0.05	16.2	<0.002	28.3	17.6		1090	<0.02	0.0016	0.0150	<0.001	<0.001	<0.002	0.0084	<0.001	<0.005	7.2			
12/1/2020	16.95	5.66	8740	75.0	14.45	60.0	<5	5400	40.0	0.11	1400	3100	<0.2		490	240	<0.05	14.0	<0.002	30.0	14.0		1200	<0.02	0.0014	0.0160	<0.001	<0.001	<0.002	0.0100	<0.001	0.0009	13.0			
1/28/2021	20.46	5.90	7710	78	12.10	51	<5.0	6200	9	0.19	1200	2600	<0.13		460	200	<0.034	11.0	<0.0017	19	11		950	<0.015	0.00220	0.0180	<0.00031	<0.00020	<0.00098	0.0084	<0.00045	0.0012	13.0			
4/2/2021	16.56	5.51	5510	92	11.62	51	<5.0	5800	30	0.17	1400	2600	<0.13	51	430	190	0.450	15.0	0.00350	9.5	12	<0.0049	1100	0.0130	<0.0041	0.0160	0.00062	0.00092	<0.00063	0.0130	<0.0028	<0.0060	14.0	6.6	1.50	0.0013
8/20/2021	18.25	7.28	6840	124	15.75	54	<5.0	6200	13	0.14	1300	3100	<0.13	51	430	200	0.040	15.0	<0.0017	17	13	<0.0011	1200	<0.015	0.00086	0.0140	<0.00062	<0.00020	<0.0025	0.0120	<0.00045	<0.00089	14.0	6.5	1.60	0.00021
12/13/2021	12.72	5.83	2380	57	12.72	55	<5.0	5400	54	<0.13	1300	2400	<0.13	51	420	140	0.026	17.0	0.00092	10	16	<0.00061	1100	0.0083	<0.00031	0.0130	<0.00018	<0.00022	<0.0015	0.0087	<0.00013	<0.0015	14.0	6.5	1.50	0.00036
3/3/2022	11.92	5.55	3670	107	12.40	44	15	2500	23	0.12	480	1100	<0.13	35	160	55	0.023	8.4	<0.0011	3	7.7	<0.00061	520	0.0063	0.00041	0.0098	<0.00027	<0.00022	<0.0015	0.0060	0.00021	<0.00074	14.0	6.6	0.64	<0.00047
4/7/2022	11.12	5.79	2940	116	13.11	47	-19.6	1900	26	0.12	360	970	<0.13	31	150	52	0.026	`5.9	<0.0011	2.7	7.8	<0.00061	410	0.0032	0.00064	0.0092	<0.00027	<0.00022	<0.0015	0.0043	<0.00017	<0.00074	14.0	6.7	0.56	<0.00047
8/1/2022	13.43	6.18	4160	165	14.78	49	-7.3	2400	20	<0.12	570	1300	<0.13	33	210	66.0	<0.034	7.200	0.00240	5.8	9.5	<0.0011	550.0	<0.015	<0.00075	0.0120	<0.00062	<0.00020	<0.0025	0.0045	<0.00045	<0.00089	16.0	7.3	0.80	<0.00020
10/28/2022	N/A	7.04	1490	39	13.80	160	-142	1000	21	0.11	69	590	<0.13	5.7	190	54.0	<0.034	0.250	<0.0017	16	1.2	<0.0011	59.0	<0.015	<0.00075	0.0160	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	18.0	8.2	1.90	<0.00020
3/9/2023	14.13	5.79	7280	87	11.37	56	-8.25	5000	8.5	<0.12	1100	2300	<0.13	48	340	100.0	<0.034	17.0	<0.0017	14	14.0	<0.0011	1100.0	<0.015	0.00120	0.0110	<0.00062	<0.00020	<0.0025	0.0059	<0.00045	<0.00089	14.0	6.7	1.40	<0.00020
4/14/2023	13.08	5.74	5570	86	13.75	180	-165	3700	7.8	0.048	790	1800	<0.13	42	230	62.0	<0.034	14.0	<0.0017	8.4	9.1	<0.0011	810.0	<0.015	0.00140	0.0096	<0.00062	<0.00020	<0.0012	0.0040	<0.00045	<0.00089	14.0	6.8	1.00	<0.00020
8/22/2023	14.88	5.68	4980	56	14.88	61	-68.4	3700	7.7	<0.12	670	1900	<0.13	47	340	74.0	<0.034	12.0	<0.0017	12	9.8	<0.0011	730.0	<0.015	0.00090	0.0110	<0.00062	<0.00020	<0.0012	0.0049	<0.00045	<0.00089	15.0	6.8	1.30	<0.00020
12/4/2023	15.62	6.69	6030	27	13.35	65	-369	4100	6.8	0.077	860	2300	<0.13	49	410	82.0	<0.034	15.0	<0.0017	13	10.0	<0.0011	860.0	<0.015	0.00089	0.0120	<0.00062	<0.00020	<0.0012	0.0047	<0.00045	<0.00089	13.0	6.0	1.50	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																				
5/23/2024	13.00	6.47	2320	53	14.84	77	-70	1600	19	0.200	180	920	<0.13	26	240	32.0	<0.034	4.1	<0.0017	2.2	3.9	<0.0011	230.0	<0.015	<0.00075	0.0086	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	16.0	7.5	0.58	<0.00020

Record of Duplicates

8/20/2019						82.2	< 8	6300	23.1	0.2	1390	2620	< 0.002	51.5	440	218	0.1400	12.3	< 0.001	34.2	17.7	< 0.002	782	0.0100	0.00149	0.0158	< 0.0001	0.00007	0.0005	0.0121	< 0.0002	0.0013	14.0		1.69	< 0.0005
Duplicate						86.3	< 8	6100	23.5	0.2	1380	2570	< 0.002	51.9	411	213	0.1380	12.3	< 0.001	33.8	17.7	< 0.002	729	0.0100	0.00151	0.0157	< 0.0001	0.00006	0.0004	0.0122	< 0.0002	0.0012	14.0		1.67	0.0005
12/13/2021						55	<5.0	5400	54	<0.13	1300	2400	<0.13	51	420	140	0.026	17.0	0.00092	10	16	<0.00061	1100	0.0083	<0.00031	0.013	<0.00018	<0.00022	<0.0015	0.0087	<0.00013	<0.0015	14.0	6.5	1.5	0.00036
Duplicate						53	18	5500	51	0.15	1200.00	2300	<0.13	52	410	140	0.170	17.0	0.00110	14	16	<0.00061	1100	0.0091	0.00100	0.013	<0.00018	<0.00022	<0.0015	0.0086	0.00027	<0.0015	14.0	6.7	1.5	0.00031
8/22/2023	14.88	5.68	4980	56	14.88	61	-68.40	3700	7.70	<0.12	670	1900	<0.13	47	340	74	<0.034	12.0	<0.0017	12	9.8	<0.0011	730	<0.015	0.00090	0.011	<0.00062	<0.00020	<0.0012	0.0049	<0.00045	<0.00089	15.0	6.8	1.3	<0.00020
Duplicate						60	-75.0	3900	8.00	<0.12	670	1900	<0.13	47	340	74	<0.034	12.0	<0.0017	12	9.8	<0.0011	740	<0.015	<0.00075	0.011	<0.00062	<0.00020	<0.0012	0.0050	<0.00045	<0.00089	14.0	6.7	1.4	<0.00020
5/23/2024						77	-70	1600	19	0.200	180	920	<0.13	26	240	32	<0.034	4.1	<0.0017	2.2	3.9	<0.0011	230.0	<0.015	<0.00075	0.0086	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	16.0	7.5	0.58	<0.00020
Duplicate						78	-75.80	1700	20	0.200	180	910	<0.13	26	250	33	<0.034	4.4	<0.0017	2.2	3.9	<0.0011	230.0	<0.015	<0.00075	0.0085	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	16.0	7.7	0.58	<0.00020

MW-1703

SAMPLING DATE	Field Measurements: Depth to SWL (ft)	pH	Cond (microS/cm)	Redox (mv)	Temperature (°C)	Alkalinity (mg/L CaCO3)	Acidity (mg/L CaCO3)	TDS (mg/L)	TSS (mg/L)	Fluoride (mg/L)	Chloride (mg/L)	SO4 (mg/L)	Hg (ug/L)	K (mg/L)	Ca (mg/L)	Mg (mg/L)
Sample Size	19	19	19	18	19	19	19	19	19	19	19	19	19	9	19	19
Average of detected	7.03	6.32	6689.7	-3.6	14.5	115.4	-35.3	5171.7	44.8	0.210	1147.4	2308.4	<0.2	46.3	430.8	201.8
Std.Dev. Of detected	2.94	0.27	2326.7	35.3	2.3	93.6	86.9	1503.0	59.4	0.074	508.8	640.9	NA	14.1	98.1	48.1
Maximum of Detected	17.43	6.95	10200.0	56.0	17.5	338.0	43.6	7000.0	256.0	0.340	1800.0	3200.0	<0.2	61.7	558.0	307.0
Median of Detected	6.20	6.39	7360.0	1.3	14.4	72.2	-18.4	5530.0	21.0	0.200	1320.0	2600.0	<0.2	52.4	467.0	197.0
Minimum of Detected	3.62	5.80	2493.0	-80.0	10.2	40.6	-185.0	2090.0	5.1	0.100	109.0	1010.0	<0.2	20.3	273.0	130.0
% of Detected	100.0	100.0	100.0	50.0	100.0	94.7	15.8	94.7	100.0	94.7	100.0	100.0	0.0	100.0	100.0	94.7
DL							<2						<0.2			
6/19/2017	7.71	6.47	2493	-59.0	14.4	92.3	<5	2090	37.0	0.200	109	1340	<0.09		273	158
9/13/2017	8.20	6.17	2752	6.4	16.8	40.6	<0.1	2240	19.0	0.210	274	1360	<0.09		280	170
11/8/2017	7.95	6.39	2948	-32.3	16.3	312	< 5	2090	53.5	0.320	374	1010	< 0.09		284	157
2/6/2018	8.11	6.43	4181	-38.2	10.2	338	< 5	2520	117.0	0.340	597	1240	< 0.09		370	176
5/1/2018	5.59	6.05	5700	-0.7	13.2	69.8	< 5	4950	19.3	0.150	827	2650	< 0.002	20.3	480	251
7/10/2018	6.45	6.43	6550	-19.9	16.3	49.6	< 5	5200	5.7	0.200	1050	2690	< 0.002	28.2	557	307
10/16/2018	6.12	6.11	7480	29.4	16.9	67	< 8	5740	5.4	0.100	1340	2560	< 0.002	39.4	558	274
2/12/2019	5.35	6.44	8100	25.6	12.5	< 3	43.60	6360	256.0	0.100	1480	2830	< 0.002	52.4	501	240
5/14/2019	6.20	6.51	7900	19.2	13.7	65.8	< 8	6600	64.5	< 0.07	1390	2860	< 0.002	57.3	545	226
8/20/2019	6.11	5.80	7630	-7.1	16.8	81.3	< 8	6260	5.1	0.200	1320	2720	< 0.002	61.7	494	207
11/19/2019	5.52	6.70	7360	13.8	15.0	68	< 8	5650	23.5	0.200	1430	2010	< 0.002		387	162
2/18/2020	5.04	5.96	6320		12.7	58	< 8	5310	86.0	0.200	1460	2070	< 0.002		376	143
4/29/2020	4.95	6.39	6330	-32.5	13.7	72.3	< 8	5960	15.3	0.100	1210	2620	< 0.002		467	182
CIP took over sampling																
9/22/2020	6.49	6.95	8781	3.3	17.54	92.5	-19.2	5410	22.0	0.252	1400	2800	<0.2		433	187
12/2/2020	9.72	6.27	9200	-80.0	13.48	260	-185.0	6500	58.0	0.270	1800	2400	<0.2		480	220
1/13/2021	17.43	6.12	10200	56	12.81	72	17.0	6200	16.0	0.150	1800	3200	<0.13		520	230
4/2/2021	8.26	6.09	9740	24	10.17	200	-124.0	7000	21.0	0.320	1800	2800	<0.13	56	510	220
9/14/2021	3.62	6.44	5130	-11	16.73	65	39.0	4100	15.0	0.270	940	2100	<0.13	47	300	130
10/12/2021	4.75	6.39	8310	39	16.80	74	-18.4	5000	11.0	0.20	1200	2600	<0.13	54	370	150
Well Removed, sampling discontinued																

SAMPLING DATE	Al (mg/L)	B (mg/L)	Cu (mg/L)	Fe (mg/L)	Mn (mg/L)	Mo (mg/L)	Na (mg/L)	Zn (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Cd (mg/L)	Cr (mg/L)	Ni (mg/L)	Pb (mg/L)	Se (mg/L)	SiO2 (mg/L)	Si (mg/L)	Sr (mg/L)	Tl (mg/L)
Sample Size	19	19	19	19	19	9	19	19	19	19	18	19	19	19	19	19	19	3	9	9
Average of detected	0.942	9.46	0.00074	38.8	13.18	0.00017	780.2	0.0110	0.0035	0.0221	0.00010	0.000175	0.00116	0.013	0.00009	0.00082	17.2	7.8	1.537	0.00207
Std.Dev. Of detected	3.502	6.08	0.00146	14.4	8.82	0.00005	422.3	0.0090	0.0022	0.0168	0.00021	0.000332	0.00141	0.010	0.00013	0.00032	2.9	0.2	0.155	0.00439
Maximum of Detected	13.600	18.10	0.00480	64.6	35.90	0.00020	1300.0	0.0370	0.0093	0.0777	0.00069	0.000910	0.00382	0.049	0.00045	0.00120	21.3	8.0	1.700	0.01200
Median of Detected	0.020	10.20	0.00010	36.0	9.70	0.00017	940.0	0.0093	0.0030	0.0166	0.00004	0.000020	0.00050	0.012	0.00005	0.00096	17.9	7.9	1.590	0.00031
Minimum of Detected	0.008	0.33	0.00002	19.0	6.27	0.00013	44.4	0.0010	0.0012	0.0125	0.00001	0.000008	0.00010	0.002	0.00003	0.00020	8.2	7.6	1.200	0.00022
% of Detected	78.9	100.0	57.9	100.0	94.7	22.2	100.0	84.2	100.0	100.0	55.6	36.8	68.4	100.0	52.6	78.9	100.0	100.0	100.0	77.8
DL												<0.00005	<0.0001			<0.0005				
6/19/2017	13.600	0.33	0.00042	46.1	6.27		44	0.002	0.005	0.019		<0.00001	0.00382	0.007	0.00004	0.00020	19.2			
9/13/2017	0.013	0.98	0.00006	39.1	4.12		85	0.004	0.002	0.014	0.00004	<0.0001	0.00240	0.012	0.00004	<0.00003	19.6			
11/8/2017	0.010	1.04	0.00009	55.0	26.80		95	0.001	0.008	0.058	0.00003	< 0.00001	0.00071	0.002	0.00006	0.00030	21.3			
2/6/2018	0.034	1.69	0.00010	64.6	35.90		237	0.002	0.006	0.078	0.00003	< 0.000005	0.00228	0.007	0.00006	0.00040	18.0			
5/1/2018	0.018	3.01	0.00008	60.0	12.70	0.000	379	0.007	0.003	0.022	0.00001	0.000008	0.00030	0.012	0.00004	0.00060	20.9		1.38	0.000219
7/10/2018	0.017	4.60	0.00020	58.4	10.10	0.000	555	0.011	0.003	0.020	0.00006	< 0.00002	0.00020	0.014	0.00004	0.00110	19.5		1.52	0.000311
10/16/2018	0.073	7.53	0.00030	50.0	6.70	< 0.002	765	0.020	0.003	0.018	< 0.0001	< 0.00005	0.00050	0.017	0.00010	0.00110	18.2		1.59	0.0006
2/12/2019	0.020	7.63	0.00010	41.2	6.60	< 0.002	1050	0.010	0.002	0.015	< 0.0001	< 0.00005	< 0.0002	0.014	< 0.0001	0.00120	18.0		1.65	< 0.0005
5/14/2019	0.016	8.93	0.00002	34.8	6.94	< 0.0004	797	0.010	0.001	0.015	0.00005	0.00003	0.00020	0.012	0.00003	0.00100	16.7		1.62	0.0003
8/20/2019	0.103	11.30	< 0.001	29.8	6.44	< 0.002	838	0.010	0.002	0.017	< 0.0001	< 0.00005	0.00060	0.013	< 0.0002	0.00100	13.9		1.57	< 0.0005
11/19/2019	0.008	18.10	< 0.0002	23.3	6.38		946	0.007	0.002	0.014	0.00004	0.00002	0.00010	0.011	< 0.00005	0.00080	14.7			
2/18/2020	0.010	16.20	< 0.0002	30.9	8.29		1130	0.009	0.002	0.014	0.00005	0.00002	0.00010	0.011	< 0.00005	0.00100	17.9			
4/29/2020	0.026	10.20	< 0.0002	23.5	8.35		952	0.008	0.001	0.013	0.00004	0.00002	0.00010	0.011	0.00006	0.00070	14.5			
CIP took over sampling																				
9/22/2020	<0.05	15.30	<0.002	28.6	12.40		1110	<0.02	0.003	0.017	<0.001	<0.001	<0.002	0.008	<0.001	<0.005	8.2			
12/2/2020	<0.05	12.00	<0.002	51.0	25.00		1100	<0.02	0.004	0.025	<0.001	<0.001	<0.002	0.006	<0.001	0.00096	17.0			
1/13/2021	<0.34	16.00	<0.0017	26	13		1300	<0.015	0.0034	0.014	<0.00031	<0.00020	<0.00098	0.024	<0.00045	0.00089	17			
4/2/2021	0.1	16.00	0.0048	36	25	<0.0049	1300	0.037	0.0093	0.02	0.00069	0.00091	0.0038	0.049	<0.0028	<0.012	18	7.6	1.7	0.012
9/14/2021	0.08	13.00	0.002	20	9.3	<0.0011	940	0.019	0.003	0.013	<0.00062	0.00022	<0.0025	0.010	0.00045	0.0011	17	7.9	1.2	0.00077
10/12/2021	<0.034	16.00	<0.0017	19	11	<0.0011	1200	0.018	0.0022	0.014	<0.00062	<0.00020	<0.0025	0.013	<0.00045	<0.00089	17	8	1.6	0.00026
Well Removed, sampling discontinued																				

Record of Duplicates

	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
4/2/2021	200.00	-124.00	7000	21.0	0.320	1800	2800	<0.13	56	510	220	0.1	16.00	0.0048	36	25	<0.0049	1300	0.037	0.0093	0.02	0.00069	0.00091	0.0038	0.049	<0.0028	<0.012	18	7.6	1.7	0.012
4/2/2021 Duplicate	200.00	-253.00	7300	24.0	0.33	1800	2800	<0.13	56	510	230	0.14	15.00	0.0072	36	25	<0.0049	1300	0.036	0.013	0.021	<0.00060	0.00094	0.0039	0.047	<0.0028	<0.012	18	7.7	1.7	0.014

MW-1704

SAMPLING DATE	Depth to SWL (Field Measurements) ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L
Sample Size	19	19	19	19	19	19	19	19	19	19	19	19	19
Average of detected	54.66	6.86	1598.1	-47.5	12.8	154.6	-130.6	1122.8	31.8	0.123	46.1	639.6	<0.2
Std.Dev. Of detected	1.37	0.37	836.9	29.1	0.9	20.0	20.4	66.8	26.9	0.018	6.1	33.9	NA
Maximum of Detected	57.40	7.82	5020.0	1.0	15.0	185.0	-99.5	1240.0	87.0	0.150	53.0	712.0	<0.2
Median of Detected	54.80	6.73	1450.0	-46.4	12.6	154.0	-133.0	1130.0	18.7	0.120	47.4	628.0	<0.2
Minimum of Detected	52.70	6.40	1110.0	-136.8	11.6	114.0	-155.0	1000.0	2.5	0.100	28.5	593.0	<0.2
% of Detected	100.0	100.0	100.0	5.3	100.0	100.0	0.0	94.7	100.0	100.0	100.0	100.0	0.0
DL							<2						<0.2
6/19/2017	52.84	6.63	1445	-43.3	12.7	164	<5	1160	7.0	0.100	28.5	662	<0.09
9/13/2014	54.24	6.62	1454	-32.6	13.6	122	<0.1	1110	56.9	0.100	36.2	668	<0.09
11/8/2017	55.20	6.54	1469	-14.1	12.3	140	< 5	1090	68.9	0.100	40.1	666	< 0.09
2/6/2018	55.50	6.76	1495	-28.3	11.8	134	< 5	1130	69.3	0.100	40.1	682	< 0.09
5/1/2018	52.99	6.56	5020	-136.8	13.5	131	< 5	1130	69.0	0.100	44.4	712	< 0.002
7/10/2018	54.12	7.24	1450	-70.1	12.9	114	< 5	1140	87.0	0.140	46.0	676	< 0.002
10/16/2018	54.55	6.81	1460	-43.4	12.6	145	< 8	1150	51.0	0.100	47.4	681	< 0.002
2/12/2019	52.70	7.08	1480	-46.4	12.2	154	< 8	1160	46.4	0.120	50.6	645	< 0.002
5/14/2019	53.11	7.16	1470	-66.5	13.2	170	< 8	1200	18.7	0.140	48.2	628	< 0.002
8/20/2019	55.02	6.4	1430	-65.8	13.1	172	< 8	1240	16.4	0.130	50.3	620	< 0.002
11/19/2019	55.42	7.5	1440	-52.7	12.2	184	<8	1170	15.0	0.120	51.8	593	< 0.002
2/18/2020	54.10	6.73	1260	-47.9	12.3	185	< 8	1180	10.9	0.130	53.0	623	< 0.002
4/29/2020	53.04	7.12	1260	-69.6	12.5	170	< 8	1190	2.5	0.120	52.2	631	< 0.002
CIP took over sampling													
9/22/2020	55.14	6.55	1610	-48.2	13.04	152	-119	1020	12.0	0.136	49.9	625	<0.2
12/2/2020	56.92	6.60	1430	-31.0	11.64	150	-99.5	1100	19.0	0.150	46.0	610	<0.2
1/11/2021	57.40	6.60	1400	1	11.79	170	-123	1100	4	0.14	47.0	620	<0.13
4/2/2021	56.57	6.61	1470	-14	11.67	160	-143	1000	15	0.12	46.0	600	<0.13
9/8/2021	54.82	6.93	1110	-41	14.29	150	-155	1100	15	0.14	50.0	610	<0.13
10/12/2021	54.80	7.82	1210	-51	15.02	170	-144	1000	20	0.15	48.0	600	<0.13
Well Removed, Sampling Discontinued													

SAMPLING DATE	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L
Sample Size	9	19	19	19	19	19	19	19	9	19	19	19	19
Average of detected	5.56	186.5	53.7	0.0090	0.223	0.00018	22.4	1.8	0.00020	52.9	0.0015	0.00067	0.0175
Std.Dev. Of detected	0.27	10.3	2.1	0.0135	0.021	0.00015	5.5	0.2	0.00002	7.7	0.0015	0.00035	0.0007
Maximum of Detected	6.08	206.0	56.8	0.0400	0.255	0.00049	35.1	2.1	0.00021	66.0	0.0056	0.00152	0.0187
Median of Detected	5.60	187.0	53.6	0.0028	0.220	0.00014	20.2	1.7	0.00020	49.5	0.0009	0.00052	0.0177
Minimum of Detected	5.21	170.0	50.0	0.0010	0.173	0.00005	14.0	1.4	0.00018	41.8	0.0005	0.00040	0.0159
% of Detected	100.0	100.0	94.7	42.1	100.0	42.1	100.0	94.7	22.2	100.0	52.6	68.4	100.0
DL													
6/19/2017		186	53.8	0.0010	0.204	0.0003	21.5	1.79		43.8	0.0010	0.00079	0.0182
9/13/2014		190	55.0	0.0056	0.224	0.0005	35.1	2.16		41.8	0.0020	0.00152	0.0182
11/8/2017		189	54.5	0.0025	0.233	0.0001	29.5	2.05		44.6	0.0006	0.00084	0.0181
2/6/2018		178	52.1	< 0.0008	0.241	0.0001	24.3	1.92		47.4	0.0005	0.00063	0.0180
5/1/2018	5.42	184	53.9	< 0.0008	0.202	0.0001	25.4	2.12	0.000	46.9	0.0007	0.00052	0.0164
7/10/2018	5.21	195	56.0	0.0010	0.254	0.0002	25.1	2.06	0.000	49.3	0.0008	0.00053	0.0159
10/16/2018	5.65	189	55.4	0.0166	0.247	0.0002	33.0	2.12	< 0.0004	49.0	0.0020	0.00127	0.0177
2/12/2019	5.28	185	53.2	0.0030	0.235	0.0001	24.9	1.95	< 0.0004	48.8	0.0010	0.00047	0.0180
5/14/2019	5.63	193	52.6	0.0020	0.213	< 0.00002	19.9	1.72	< 0.0004	52.8	0.0008	0.00044	0.0179
8/20/2019	6.08	206	56.8	0.0400	0.200	< 0.001	20.2	1.64	< 0.002	55.1	< 0.004	0.00050	0.0187
11/19/2019		194	55.3	< 0.005	0.173	< 0.0002	18.5	1.57		45.4	< 0.0007	0.00040	0.0168
2/18/2020		193	55.9	< 0.005	0.204	< 0.0002	19.6	1.66		49.5	< 0.0007	0.00042	0.0179
4/29/2020		204	55.9	< 0.005	0.215	< 0.0002	17.4	1.56		58.2	0.0056	0.00044	0.0176
CIP took over sampling													
9/22/2020		187	53.3	<0.05	0.255	<0.002	19.4	1.76		56.2	<0.02	<0.005	0.0170
12/2/2020		170	50.0	<0.05	0.210	<0.002	17.0	1.40		64.0	<0.02	<0.005	0.0170
1/11/2021		180	53.0	<0.034	0.220	<0.0017	20	1.7		64.0	<0.015	<0.00075	0.018
4/2/2021	5.4	170	50.0	<0.047	0.220	<0.0035	14	1.4	<0.0049	64.0	<0.0097	<0.0041	0.017
9/8/2021	5.6	180	51.0	<0.034	0.240	<0.0017	23	1.8	<0.0011	59.0	<0.015	<0.00075	0.017
10/12/2021	5.8	170	52.0	<0.034	0.240	<0.0017	18	1.6	<0.0011	66.0	<0.015	<0.00075	0.017
Well Removed, Sampling Discontinued													

SAMPLING DATE	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	19	19	19	19	19	19	19	3	9	9
Average of detected	0.00008	0.000243	0.00016	0.00186	0.000043	0.00006	16.4	8.4	1.742	0.00162
Std.Dev. Of detected	0.00008	0.000336	0.00016	0.00087	0.000039	0.00003	2.2	0.4	0.183	0.00276
Maximum of Detected	0.00031	0.000480	0.00050	0.00383	0.000125	0.00010	19.0	8.8	2.080	0.00480
Median of Detected	0.00005	0.000243	0.00010	0.00182	0.000030	0.00005	16.8	8.5	1.800	0.00003
Minimum of Detected	0.00001	0.000005	0.00006	0.00086	0.000010	0.00003	8.9	8.0	1.530	0.00002
% of Detected	68.4	10.5	63.2	78.9	36.8	52.6	100.0	100.0	100.0	33.3
DL		<0.00005	<0.0001			<0.0005				
6/19/2017	0.00006	<0.000005	0.00009	0.00270	0.00003	0.00004	18.0			
9/13/2014	0.00013	<0.0001	0.00048	0.00383	0.00013	0.00010	15.6			
11/8/2017	0.00008	< 0.000005	0.00014	0.00229	0.00002	0.00010	16.0			
2/6/2018	0.00004	< 0.000005	0.00006	0.00182	< 0.000004	0.00003	15.8			
5/1/2018	0.00001	< 0.000005	0.00008	0.00178	0.00002	< 0.00003	17.8		1.59	0.00002
7/10/2018	0.00004	0.000005	0.00006	0.00187	0.00001	0.00006	16.9		1.6	0.00003
10/16/2018	0.00012	< 0.00001	0.00010	0.00212	0.00003	0.00010	16.4		1.53	< 0.0001
2/12/2019	0.00004	< 0.00001	< 0.00004	0.00194	< 0.00002	< 0.00003	18.1		1.57	< 0.0001
5/14/2019	0.00005	< 0.00001	0.00008	0.00114	< 0.00002	0.00003	17.5		1.81	< 0.0001
8/20/2019	< 0.0001	< 0.00005	0.00050	0.00090	< 0.0002	< 0.0002	15.9		2.08	< 0.0005
11/19/2019	0.00005	< 0.00001	0.00010	0.00086	< 0.00005	0.00004	15.3			
2/18/2020	0.00005	< 0.00001	0.00009	0.00094	< 0.00005	0.00003	16.8			
4/29/2020	0.00006	< 0.00001	0.00010	0.00088	0.00006	0.00008	15.4			
CIP took over sampling										
9/22/2020	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	8.9			
12/2/2020	0.000310	<0.001	<0.002	<0.002	<0.001	<0.005	14.0			
1/11/2021	<0.00031	<0.00020	<0.00098	<0.0015	<0.00045	<0.00089	18.0			
4/2/2021	<0.00060	0.00048	<0.00063	0.0031	<0.0028	<0.0060	18.0	8.0	1.8	0.0048
9/8/2021	<0.00062	<0.00020	<0.0025	0.0017	<0.00045	<0.00089	19.0	8.8	1.8	<0.00020
10/12/2021	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	18.0	8.5	1.9	<0.00020
Well Removed, Sampling Discontinued										

Record of Duplicates

	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
4/2/2021	160	-143	1000	15	0.12	46.00	600	<0.13	5.4	170	50.0	<0.047	0.220	<0.0035	14	1.4	<0.0049	64.0	<0.0097	<0.0041	0.017	<0.00060	0.00048	<0.00063	0.0031	<0.0028	<0.0060	18.0	8.0	1.8	0.0048
4/2/2021 Duplicate	160.00	-118.00	1000.00	16.00	0.12	46.00	600.00	<0.13	5.5	180	51	<0.047	0.23	<0.0035	15	1.5	<0.0049	65	<0.0097	<0.0041	0.017	<0.00060	0.00038	<0.00063	<0.0022	<0.0028	<0.0060	19	8.1	1.8	0.0048

MW-1705

SAMPLING DATE	Field Measurements Depth to SWL ft	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L
Sample Size	19	19	19	19	19	19	19	19	19	19	19	19	19	9	19	19
Average of detected	6.64	6.82	5716.7	-110.9	14.0	82.6	-16.9	4161.8	14.5	0.61	1112.7	1708.6	0.074	50.17	429.6	128.6
Std.Dev. Of detected	2.02	1.11	2041.8	122.2	2.3	73.3	46.8	1393.0	15.2	0.81	554.2	518.9	0.084	41.66	206.4	57.2
Maximum of Detected	10.87	9.38	8950.0	12.0	21.8	297.0	23.8	6840.0	55.9	3.30	2390.0	2600.0	0.220	155.00	973.0	261.0
Median of Detected	6.20	6.34	5930.0	-48.2	13.7	60.8	0.4	4460.0	10.0	0.30	1160.0	1790.0	0.058	31.90	383.0	120.0
Minimum of Detected	3.88	5.77	1991.0	-342.0	10.1	18.0	-102.0	1510.0	0.5	0.18	155.5	819.0	0.003	21.40	180.0	46.0
% of Detected	100.0	100.0	100.0	10.5	100.0	100.0	15.8	100.0	100.0	100.0	100.0	100.0	31.6	100.0	100.0	100.0
DL							<2						<0.2			
6/19/2017	8.24	6.24	1991	-44.6	14.7	47.8	<5	1585	6.3	0.18	156	864	<0.09		247	84
9/13/2017	8.65	6.15	2031	-8.7	15	44.7	<0.1	1510	11.4	0.21	231	819	<0.09		208	82
11/8/2017	8.4	8.9	6399	-304.0	15.6	270.0	< 5	4810	28.2	0.9	1920	1150	0.10		834	261
2/6/2018	8.55	7.57	5085	-284.8	12.9	102.0	< 5	3610	55.9	0.5	1000	1340	< 0.09		517	159
5/1/2018	5.92	5.77	5020	-136.8	13.5	44.2	< 5	4030	5.6	0.3	874	2000	< 0.002	21.4	386	170
7/10/2018	6.4	6.39	5930	-19.1	13.8	41.8	< 5	4460	0.5	0.2	1030	2240	< 0.002	26.3	439	209
10/16/2018	6.2	6.18	6720	-17.1	14.3	68.0	< 8	4740	4.3	0.33	1230	2130	0.02	31.9	468	201
2/12/2019	5.15	9.38	8950	-332.0	12.7	297.0	< 8	6840	46.0	2.03	2390	1670	0.10	155	973	164
5/14/2019	5.95	6.67	6640	-60.0	13.2	63.5	< 8	5040	2.0	0.3	1200	2100	< 0.002	44.8	374	147
8/20/2019	6.13	6	6740	-48.2	13.8	63.0	< 8	5420	2.0	0.3	1270	2050	< 0.002	51.1	376	143
11/19/2019	5.05	7.1	5650	-30.9	13.4	60.8	< 8	4280	8.6	0.2	1070	1470	< 0.002		294	100
2/18/2020	4.4	6.23	5340	-222.5	12.2	86.7	< 8	4340	11.6	0.3	1220	1710	0.00		339	105
4/29/2020	4.32	6.64	5100	-86.7	12.5	82.0	< 8	4560	10.4	0.2	1010	1790	0.00		383	118
CIP took over sampling																
9/22/2020	6.33	5.92	7071.4	-37.1	13.68	56.6	23.8	3550	12.0	0.196	1160	2030	<0.2		315	101
12/2/2020	10.87	9.08	7530	-342.0	13.29	18.0	-102	5100	32.0	3.3	1500	1800	<0.2		700	46
3/12/2021	9.4	6.25	8380	-27.0	13.99	61	-9.28	5400	14	0.24	1600	2600	<0.13		470	130.0
4/1/2021	8.45	6.09	7770	1.0	10.14	60	13	5100	10	0.3	1400	2400	<0.13	64	400	120.0
9/8/2021	3.88	6.67	2010	-119.0	21.80	60	-36.7	2100	10	1.4	320	1100	0.22	29	260	47.0
10/12/2021	3.95	6.34	4260	12.0	15.46	42	10	2600	5	0.2	560	1200	<0.13	28	180	56.0
Well Removed, Sampling Discontinued																

SAMPLING DATE	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	19	19	19	19	19	9	19	19	19	18	19	19	19	19	19	19	19	3	9	9
Average of detected	0.066	23.0	0.00056	23.1	6.48	0.0035	639.9	0.0131	0.0160	0.0292	0.000122	0.000580	0.0012	0.0205	0.00011	0.0042	19.4	11.0	1.897	0.00326
Std.Dev. Of detected	0.063	25.8	0.00111	12.9	3.01	0.0048	344.3	0.0131	0.0358	0.0226	0.000208	NA	0.0020	0.0357	0.00019	0.0088	6.1	0.0	1.802	0.00458
Maximum of Detected	0.230	96.3	0.00350	53.3	13.00	0.0119	1300.0	0.0480	0.1600	0.1080	0.000640	0.000580	0.0078	0.1610	0.00049	0.0326	26.2	11.0	6.660	0.00650
Median of Detected	0.051	15.1	0.00026	22.6	7.11	0.0020	723.0	0.0085	0.0041	0.0221	0.000030	0.000580	0.0006	0.0101	0.00003	0.0010	22.6	11.0	1.370	0.00326
Minimum of Detected	0.009	0.9	0.00005	0.2	1.40	0.0002	46.3	0.0006	0.0010	0.0140	0.000010	0.000580	0.0002	0.0020	0.00002	0.0002	5.3	11.0	0.840	0.00002
% of Detected	78.9	100.0	47.4	94.7	94.7	55.6	100.0	63.2	100.0	100.0	57.9	5.3	68.4	100.0	31.6	89.5	100.0	100.0	100.0	22.2
DL												<0.00005	<0.0001			<0.0005				
6/19/2017	0.057	0.9	0.00030	25.3	3.60		46	0.005	0.0056	0.0267	0.00003	<0.00001	0.0007	0.0104	0.00003	0.0002	26.2			
9/13/2017	0.051	1.4	0.00008	26.6	3.49		69	0.007	0.0091	0.0236	0.00004	<0.0001	0.0006	0.0283	0.00049	0.0002	23.7			
11/8/2017	0.010	96.3	0.00026	2.3	1.40		274	< 0.002	0.0334	0.1080	< 0.00002	< 0.00002	0.0003	0.0060	0.00006	0.0326	13.2			
2/6/2018	0.009	32.8	0.00029	24.7	5.49		311	0.001	0.0154	0.0531	0.00001	< 0.000005	0.0002	0.0020	0.00002	0.0015	17.7			
5/1/2018	0.102	9.2	0.00012	37.5	7.96	0.001	394	0.015	0.0039	0.0271	0.00002	< 0.000005	0.0009	0.0241	0.00003	0.0010	25.0		1.28	0.00002
7/10/2018	0.055	10.6	0.00010	42.7	8.22	0.000	538	0.016	0.0036	0.0231	0.00006	< 0.00002	0.0003	0.0238	0.00002	0.0010	24		1.41	< 0.00005
10/16/2018	0.092	14.1	0.00030	53.3	8.99	0.002	723	0.010	0.0134	0.0254	< 0.0001	< 0.00005	0.0078	0.1610	< 0.0001	0.0023	22.8		1.46	< 0.0005
2/12/2019	0.010	85.4	< 0.0001	0.2	2.33	0.012	841	< 0.004	0.0215	0.0522	< 0.0001	< 0.00005	< 0.0002	0.0035	< 0.0001	0.0035	5.31		6.66	< 0.0005
5/14/2019	0.038	15.3	0.00005	20.5	7.23	< 0.0004	750	0.005	0.0030	0.0174	0.00004	< 0.00001	0.0006	0.0130	< 0.00002	0.0008	18.1		1.25	< 0.0001
8/20/2019	0.149	17.8	< 0.001	23.4	7.64	< 0.002	859	0.007	0.0039	0.0187	< 0.0001	< 0.00005	0.0011	0.0163	< 0.0002	0.0010	18.5		1.37	< 0.0005
11/19/2019	0.020	15.1	< 0.0002	21.7	6.99		716	0.001	0.0047	0.0163	0.00003	< 0.00001	0.0002	0.0101	< 0.00005	0.0007	18.3			
2/18/2020	0.020	14.9	< 0.0002	26.5	8.50		894	< 0.0007	0.0032	0.0203	0.00003	< 0.00001	0.0002	0.0044	< 0.00005	0.0008	22.6			
4/29/2020	0.026	13.7	< 0.0002	14.7	6.68		810	< 0.0007	0.0041	0.0181	0.00003	< 0.00001	0.0003	0.0056	< 0.00005	0.0008	17.1			
CIP took over sampling																				
9/22/2020	<0.05	16.1	<0.002	19.9	8.65		923	0.020	0.0026	0.0166	<0.001	<0.001	<0.002	0.0083	<0.001	0.0009	10.6			
12/2/2020	<0.05	41.0	<0.002	<0.1	1.80		850	<0.02	0.1600	0.0280	0.00042	<0.001	<0.002	0.0031	<0.001	0.0210	8.7			
3/12/2021	<0.034	20.00	<0.0017	30.0	13.00		1300.0	<0.015	0.0010		<0.00031	<0.00020	<0.00098	0.0062	<0.00045	0.0019	26			
4/1/2021	0.120	18.00	0.0035	17.0	9.10	<0.0049	1100.0	0.0480	0.0094	0.021	0.00064	0.00058	0.00180	0.044	<0.0028	<0.0060	24	11	1.7	0.0065
9/8/2021	0.230	7.00	<0.0017	14.0	4.00	0.0027	260.0	0.0220	0.0041	0.016	<0.00062	<0.00020	<0.0025	0.012	<0.00045	0.0019	23	11	1.1	<0.00020
10/12/2021	<0.034	7.40	<0.0017	15.0	5.10	<0.0011	500.0	<0.015	0.0023	0.014	<0.00062	<0.00020	<0.0025	0.0068	<0.00045	<0.00089	23	11	0.84	<0.00020
Well Removed, Sampling Discontinued																				

Record of Duplicates

SAMPLING DATE	Alkalinity	Acidity	TDS	TSS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2
6/19/2017	46.9	<5	1610	5.9	0.18	155.00	865	<0.09		246	83.2	65.8000	0.898	0.00027	25.2	3.59		46.0	0.0050	0.00554	0.027	0.00003	<0.00001	0.000661	0.0104	0.00004	0.0002	26.3
Duplicate	48.7	<5	1560	6.7	0.18	156.00	862	<0.09		248	84.5	47.5000	0.881	0.00033	25.3	3.6		46.6	0.0049	0.00567	0.027	0.00003	<0.00001	0.000756	0.0104	0.00002	0.0002	26.1

Oxfornd Pond Total

SAMPLING DATE	pretreatment	pH (Field Measurements)	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	Water flow cfs	TSS mg/L	Hg ppt	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	SiO2 mg/L
Background																																	
Sample Size	20	13	12	0	0	13	13			13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	17	16	13	13	13	
Average of detected	0.0	7.34	1579	0.00	0.00	117	0.20			129	4.4	165	85	<0.03	0.073	0.01	0.1	2.25	0.003	10	0.02	<0.009	0.037	<0.0004	0.00033	0.0049	0.023	<0.004	<0.012	1.77	0.69	<0.003	
Std.Dev. Of detected	NA	0.31	416	NA	NA	47	0.11			120	1.4	61	30	NA	0.019	NA	0.2	1.61	0.001	4	0.01	NA	0.013	NA	0.00007	0.0016	0.012	NA	NA	0.67	0.28	NA	
Maximum of Detected	0.0	7.83	2000	0.00	0.00	179	0.40			383	6.4	236	122	<0.03	0.097	0.01	0.7	5.51	0.004	15	0.03	<0.009	0.064	<0.0004	0.00040	0.0076	0.042	<0.004	<0.012	2.96	1.01	<0.003	
Median of Detected	0.0	7.30	1693	0.00	0.00	116	0.17			108	4.5	170	86	<0.03	0.080	0.01	0.1	2.43	0.002	10	0.02	<0.009	0.037	<0.0004	0.00033	0.0047	0.019	<0.004	<0.012	1.96	0.69	<0.003	
Minimum of Detected	0.0	6.83	645	0.00	0.00	44	0.07			6	2.3	28	19	<0.03	0.039	0.01	0.0	0.40	0.002	3	0.01	<0.009	0.013	<0.0004	0.00027	0.0015	0.007	<0.004	<0.012	0.36	0.11	<0.003	
% of Detected	0	100	100	#DIV/0!	#DIV/0!	100	100			100	100	100	100	0	100	8	100	100	77	100	69	0	100	0	31	100	100	0	0	100	100	0	
DL										<0.10				<0.03		<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001		<0.004	<0.012			<0.003	
11/27/2009	Total	7.83				169	0.21			189	6.36	219	122	<0.04	0.086	<0.002	0.034	0.40	0.003	15.2	0.007	<0.007	0.037	<0.0005	0.0004	0.004	0.007	<0.004	<0.012	1.74	1.00	<0.007	
12/27/2009	Total																																
1/26/2010	Total																																
2/5/2010	Total																																
3/22/2010	Total	7.13	645			54	0.14			28	2.26	90	43	<0.04	0.039	<0.002	0.094	4.82	0.002	4.6	0.033	<0.007	0.021	<0.0005	<0.0003	0.005	0.042	<0.004	<0.012	0.81	0.37	NA	
4/19/2010	Total	7.30	1529			121	0.40			305	5.71	228	114	<0.04	0.080	<0.002	0.179	2.46	0.002	13.4	0.023	<0.007	0.047	<0.0005	<0.0003	0.005	0.033	<0.004	<0.012	1.63	1.01	<0.007	
5/17/2010	Total	7.52	1586			100	0.26			383	4.50	188	95	<0.04	0.066	<0.002	0.126	1.57	0.003	10.8	0.008	<0.007	0.038	<0.0005	<0.0003	0.003	0.022	<0.004	<0.012	1.23	0.82	<0.007	
7/2/2010	Total	7.50	1821			116	0.39			108	3.56	165	85	<0.04	0.097	<0.002	0.161	5.51	0.004	9.0	0.006	<0.007	0.033	<0.0005	0.0003	0.008	0.030	<0.004	<0.012	2.00	0.65	NA	
8/5/2010	Total	7.23	1799			44	0.11			115	2.42	28	19	<0.04	0.040	0.010	0.729	0.83	0.002	2.6	0.022	<0.007	0.013	<0.0005	<0.0003	0.001	0.014	<0.004	<0.012	0.36	0.11	<0.007	
8/23/2010	Total	7.26	1847			130	0.10			22	5.63	236	116	<0.04	0.088	<0.002	0.090	2.94	<0.001	13.0	<0.002	<0.007	0.043	<0.0005	<0.0003	0.006	0.018	<0.004	<0.012	1.70	0.99	NA	
9/30/2010	Total	7.47	2000			175	0.29			162	5.89	226	111	<0.04	0.095	<0.002	0.027	1.35	0.004	13.4	<0.002	<0.007	0.041	<0.0005	<0.0003	0.005	0.012	<0.004	<0.012	1.96	0.99	<0.007	
10/27/2010	Total	7.83	1925			175	0.17			8	5.46	170	86	<0.04	0.080	<0.002	0.004	0.60	0.002	10.2	<0.002	<0.007	0.034	<0.0005	0.0003	0.006	0.014	<0.004	<0.012	2.06	0.74	NA	
11/17/2010	Total	7.54	1989			179	0.20			6	4.64	162	82	<0.04	0.081	<0.002	0.001	0.53	0.002	9.6	<0.002	<0.007	0.035	<0.0005	0.0004	0.004	0.012	<0.004	<0.012	2.20	0.69	<0.007	
3/29/2011	Total	7.02	1244			84	0.07			224	3.72	151	79	<0.04	0.059	<0.002	0.143	3.10	<0.001	7.6	0.035	<0.009	0.026	<0.0004	<0.0004	0.006	0.039	<0.004	<0.012	2.11	0.59	<0.007	
5/20/2011	Total	6.83	1503			94	0.15			97	4.17	181	94	<0.03	0.078	<0.002	0.052	2.43	0.002	9.2	0.018	<0.009	0.064	<0.0004	<0.0004	0.005	0.035	<0.004	<0.012	2.96	0.67	NA	
7/7/2011	Total	6.96	1058			76	0.07			27	2.81	100	63	<0.03	0.064	<0.002	0.014	2.64	<0.001	6.2	0.007	<0.009	0.044	<0.0004	<0.0004	0.007	0.019	<0.004	<0.012	2.24	0.38	<0.003	
Reclamation Began																																	
Sample Size		70	68	32	37	68	68	46	29	65	69	69	69	69	68	69	69	69	69	69	69	69	69	69	69	69	69	69	69	52	69	69	21
Average of detected		7.2	2884	114.2	16.44	144	-25.9	0.0	5.1	4.3	16.8	307	142	0.10	0.762	0.003	0.25	5.02	0.0020	136	0.018	0.0012	0.049	0.0002	0.0008	0.0031	0.026	0.000	0.001	4.20	1.22	0.00215	11.209
Std.Dev. Of detected		0.6	957	81.3	7.94	43	74.4	0.0	4.3	4.2	12.0	87	38	0.11	0.700	0.009	0.27	5.77	0.0011	110	0.031	0.0030	0.056	0.0003	0.0022	0.0030	0.022	0.000	0.001	1.45	0.31	0.00286	2.785
Maximum of Detected		8.5	5130	261.0	29.70	257	38.0	0.1	20.0	18.3	43.0	480	220	0.45	2.200	0.042	1.10	43.00	0.0041	400	0.208	0.0146	0.300	0.0010	0.0111	0.0130	0.146	0.001	0.002	8.22	2.00	0.00840	16.000
Median of Detected		7.3	2758	115.7	17.30	146	0.1	0.0	3.9	2.5	12.0	322	149	0.05	0.479	0.001	0.14	3.70	0.0021	131	0.009	0.0005	0.034	0.0001	0.0002	0.0028	0.021	0.000	0.000	4.47	1.24	0.00026	11.700
Minimum of Detected		5.5	1186	-20.6	2.14	74	-457.0	0.0	0.6	0.7	2.1	81	37	0.01	0.058	0.000	0.00	0.10	0.0001	4	0.002	0.0003	0.003	0.0000	0.0000	0.0001	0.001	0.000	0.000	1.23	0.35	0.00003	1.780
% of Detected		100	100	94	100	100	57	17	97	57	100	100	99	35	100	30	94	100	59	100	70	32	100	19	38	75	100	20	26	100	100	23.2	100.0
DL										<0.10				<0.03		<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001		<0.004	<0.012			<0.003	<0.004
8/10/2011	Total	7.40	1743			145	0.11			0.9	3.98	194	106	<0.03	0.093	<0.002	0.003	2.16	0.002	11.4	0.002	<0.009	0.063	<0.0004	<0.0004	0.009	0.017	<0.004	<0.012	3.17	0.79	0.004	
9/15/2011	Total	7.64	2450			257	0.15			6.0	7.01	279	147	<0.03	0.135	<0.002	<0.001	9.42	0.003	18.4	0.004	<0.009	0.083	<0.0004	<0.0004	0.013	0.036	<0.004	<0.012	4.17	1.30	<0.003	
10/5/2011	Total	7.69	2410			246	0.15			2.2	7.17	336	169	<0.03	0.143	<0.002	0.068	8.18	0.004	21.5	0.009	<0.009	0.101	<0.0004	0.0010	0.010	0.042	<0.004	<0.012	4.53	1.56	<0.003	
11/16/2011	Total	8.06				147	0.09			5.9	7.07	214	109	<0.03	0.091	0.008	0.426	2.68	0.003	14.1	0.036	<0.009	0.074	<0.0004	0.0006	0.007	0.031	<0.004	<0.012	3.28	1.05	<0.003	
12/29/2011	Total	7.54	1484			106	0.08			2.5	5.63	193	104	<0.03	0.088	<0.002	0.334	2.16	<0.001	11.7	0.026	<0.009	0.027	<0.0004	<0.0004	0.005	0.035	<0.004	<0.012	3.71	0.91	<0.003	
1/30/2012	Total	7.10	1520			120	0.19			11.4	4.92	204	109	<0.03	0.106	<0.002	0.446	4.71	0.003	11.8	0.039	<0.009	0.060	<0.0004	<0.0004	0.005	0.052	<0.004	<0.012	5.30	0.87	<0.003	
3/6/2012	Total	7.99	1733			151	0.12			1.1	4.31	201	108	<0.03	0.111	<0.002	0.531	6.09	0.002	12.6	0.029	<0.009	0.058	<0.0004	<0.0004	0.009	0.052	<0.004	<0.012	5.74	0.81	<0.003	
4/19/2012	Total	7.60	1867			159	0.08			1.5	4.89	235	125	<0.03	0.117	0.042	0.248	2.79	0.002	15.7	0.058	<0.009	0.069	<0.0004	0.0024	0.005	0.047	<0.004	<0.012	5.73	0.99	<0.003	
5/17/2012	Total	7.34				158	0.13			3.6	5.79	247	135	<0.03	0.122	<0.002	0.092	2.90	0.002	17.0	0.011	<0.009	0.066	<0.0004	<0.0004	0.005	0.027	<0.004	<0.012	5.09	1.07	<0.003	
6/13/2012	Total	7.23	2230			192	0.23			<0.10	5.66	270	149	<0.03	0.140	<0.002	0.060	3.01	0.002	19.1	0.002	<0.009	0.075	<0.0004	<0.0004	0.005	0.024	<0.004	<0.012	4.46	1.17	0.004	
7/27/2012	Total	7.95	2180			193	0.15			2.3	6.61	282	158	<0.03	0.126	<0.002	0.046	0.93	0.003	20.6	<0.001	<0.009	0.069	<0.0004	<0.0004	0.006	0.011	<0.004	<0.012	3.07	1.28	<0.003	
8/29/2012	Total	7.76	2250			215	0.09			2.3	7.34	296	170	<0.03	0.131	<0.002	0.008	0.10	0.003	21.8	<0.001	<0.009	0.076	<0.0004	<0.0004	0.004	0.011	<0.004	<0.012	2.15	1.35	<0.003	
9/21/2012	Total	7.49	2150			209	0.05			3.4	7.91	265	152	<0.03	0.128	<0.002	0.070	0.33	0.003	20.8	0.002	<0.009	0.069	<0.0004	0.0005	0.003	0.011	<0.004	<0.012	2.71	1.31	<0.003	
10/16/2012	Total	7.91	2010			96	0.18			4.1	7.15	261	149	<0.03	0.130	<0.002	0.033	0.10	0.002	20.7	<0.001	<0.009	0.074	<0.0004	<0.0004	0.005	0.009	<0.004	<0.012	2.39	1.21	<0.003	
11/30/2012	Total	7.31	1186			191	0.07			4.3	6.24	221	127	<0.03	0.115	0.004	0.108	0.38	0.003	16.8	0.018	<0.009	0.028	<0.0004	<0.0004	0.003	0.010	<0.004	<0.012	2.20	1.04	<0.003	
12/19/2012	Total	7.71	2140			171	0.10			1.1	6.87	224	122	<0.03	0.104	<0.002	0.127	0.54	0.003	16.7	0.005	<0.009	0.074	<0.0004	<0.0004	0.004	0.011	<0.004	<0.012	2.27	1.08	0.004	
1/24/2013	Total																																
2/19/2013	Total	7.40	1605			103	0.08			1.1	3.89	138	75	<0.03	0.069	<0.002	0.461	1.78	0.002	9.3	0.005	<0.009	0.048	<0.0004	<0.0004	0.002	0.008	<0.004	<0.012	1.67	0.62	<0.003	
3/14/2013	Total	7.17	1551			125	0.12			4.4	2.12	81	37	<0.03	0.058	<0.002	0.085	0.82	0.003	3.9	0.007	0.015	0.024	<0.0004	<0.0004	0.003	0.003	<0.004	<0.012	1.63	0.37	<0.003	
5/2/2013	Total	7.63	1926			159	0.12			0.7	8.25	140	80	<0.03	0.105	<0.002	0.087	0.53	0.004	23.8	<0.001	<0.009	0.042	<0.0004	<0.0004	0.007	0.012	<0.004	<0.012	1.64	0.94	<0.003	
5/30/2013	Total	7.62	2030			165	0.11			5.6	6.49	255	135	<0.03	0.110	<0.002	0.064	1.21	<0.001	20.8	0.002	<0.009	0.144	<0.0004	0.0004	<0.001	0.012	<0.004	<0.012	1.23	1.07	0.006	
6/27/2013	Total	7.62	1666			133	0.09			5.3	6.74	223	120	<0.03	0.113	<0.002	0.065	0.88	0.003	18.7	<0.001	<0.009	0.069	<0.0004	<0.0004	<0.001	0.005	<0.004	<0.012	2.17	0.92	<0.003	
8/1/2013	Total	6.98	1850			133	0.09			9.7	5.96	128	39	0.20	0.109	<0.002	0.060	0.68	0.002	14.8	0.208	<0.009	0.047	<0.0004	0.0111	<0.001	0.146	<0.004	<0.012	8.22	0.35	0.008	
8/28/2013	Total	7.10	1953			158	0.09			2.2	5.90	227	115	<0.03	0.166	<0.002	0.229	3.21	0.002	23.5	0.003	<0.009	0.081	<0.0004	0.0004	<0.001	0.010	<0.004	<0.012	4.94	0.91	<0.003	
10/4/2013	Total	7.59	2190	51	14	193	0.18	No Flow		2.1	7.12	261	136	<0.03	0.180	<0.002	0.011	1.53	0.002	32.6	<0.001	<0.009	0.034	<0.0004	<0.0004	0.003	0.006	<0.004	<0.012	5.38	1.13	<0.003	
11/21/2013	Total	7.38	2080	202	6	181	0.16	No Flow		2.5	7.38	256	138	<0.03	0.176	<0.002	0.114	1.01	0.002	38.6	0.008	<0.009	0.070	<0.0004	0.0004	0.003	0.006	<0.004	<0.012	5.23	1.14	<0.003	
12/29/2013	Total							Frozen																									
1/20/2014	Total							Frozen																									
2/27/2014	Total	7.14	1845			137	0.26	No Flow		7.5	6.11	230	98	<0.03	0.194	<0.002	0.105	3.43	0.002	26.4	0.013	<0.009	0.300	<0.0004	<0.0004	0.005	0.021	<0.004	<0.012	4.62	0.89	<0.003	
4/1/2014	Total	7.50	2210			155	0.25	No Flow		<0.2	7.07	256	129	<0.03	0.195	<0.002	0.103	2.90	<0.001	46.1	0.008	<0.009	0.294	<0.0004	0.0007	0.004	0.019	<0.004	<0.012	4.38	1.09	<0.003	
6/10/2014	Total	7.25	2876			118	0.24	Not measured		2.1	10.0	306	148	<0.03	0.421	<0.002	0.080	6.33	<0.001	105	<0.001	0.002	0.068	<0.0004	0.0023	0.008	0.033	<0.004	<0.012	5.14	1.24	<0.003	
7/8/2014	Total	6.85	3130			134	0.25	Not measured		5.9	10.5	322	157	<0.03	0.458	<0.002	0.046	6.85	0.003	123	0.008	<0.009	0.067	<0.0004	<0.0004	0.006	0.027	<0.004	<0.012	4.95	1.39	<0.003	
7/31/2014	Total	6.72	3430			150	0.30	Not measured		<0.2	10.6	344	181	<0.03	0.477	<0.002	0.061	6.34	0.002	130	<0.001	<0.009	0.134	<0.0004	<0.0004	0.004	0.025	<0.004	<0.012	4.47	1.44	<0.003	
9/4/2014	Total	6.95	3250			163		Not measured		<0.2	10.7	314	155	<0.03	0.460	<0.002	<0.001	1.69	0.002	131	<0.001	<0.009	0.049	<0.0004	<0.0004	0.002	0.012	<0.004	<0.012	3.97	1.34	<0.003	
10/9/2014	Total	7.27	3670			173	0.22	Not measured		0.9	12.6	349	175	<0.03	0.480	<0.002	0.020	0.31	0.002	151	<0.001	<0.009	0.054	<0.0004	<0.0004	0.002	0.005	<0.004	<0.012	3.35	1.58	<0.003	
10/30/2014	Total	7.20	3210		12	192	0.21	Not measured		1.7	11.9	323	160	<0.03	0.460	<0.002	0.047	1.03	0.003	139	<0.001	<0.009	0.055	<0.0004	<0.0004	<0.001	0.006	<0.004	<0.012	3.39	1.44	<0.003	
4/2/2015	Total	6.43	2100			95	0.15	Not measured		2.5	8.1	220	100	<0.03	0.302	<0.002	<0.001	4.53	<0.001	77	0.009	<0.009	0.039	<0.0004	<0.0004	0.002	0.033	<0.004	<0.012	3.62	0.86	<0.003	
5/27/2015	Total	7.11	3350			150	0.21	Not measured		<0.2	14.7	332	162	<0.03	0.578	<0.002	0.061	5.22	0.002	153	0.006	<0.009	0.051	<0.0004	<0.0004	0.004	0.027	<0.004	<0.012	4.80	1.38	<0.003	
9/9/2015	Total	7.35	2770		25	150	0.22	Not measured		<0.2	12.5	284	132	<0.03	0.594	<0.002	0.024	2.06	0.002	131	0.002	<0.009	0.099	<0.0004	<0.0004	0.001	0.014	<0.004	<0.012	5.31	1.16	<0.003	
1/7/2016	Total																																
3/28/2016	Total																																
6/24/2016	Total	7.21	3880		24	165	0.18	Not measured		2.0	18.6	361	171	<0.03	0.761	<0.002	0.034	4.12	<0.001	203	<0.001	<0.009	0.115	<0.0004	<0.0004	0.002	0.015	<0.004	<0.012	4.10	1.55	<0.003	
6/27/2016	Total	7.34	3770	15	25		<0.008	Not measured			28.3	374	154	0.099	1.495	0.0007	0.379	8.02	0.0003	238	0.017	0.0005	0.013	<0.0002	<0.0002	0.0003	0.031	0.0002	<0.0002		1.35	<0.0001	
8/23/2016	Total	8.02	3770	14	24	172	0.22	Not measured	6.4	3.0	20.2	383	186	0.008	0.751	0.0005	0.092	2.62	0.0002	230	0.007	0.00059	0.007	<0.00005	0.00010	0.0002	0.008	0.0008	0.0002		1.49	0.00004	
10/22/2016	Total	7.44	2320		13	150	<0.008	Not Measured		18.3	22.9	363	183	<0.03	0.804	<0.002	0.251	5.03	<0.001	219	<0.001	<0.009	0.034	<0.0004	<0.0004	0.005	0.011	<0.004	<0.012	5.62	1.52	<0.003	
OSU Sampling Ended.																																	
12/6/2016	Total	7.98	3798	81.1	6.2	194	<0.008	Not Measured	15.4	6.3	21.3	411	215	0.0317	0.957	0.00057	0.603	6.04	0.00107	261	0.003	0.00091	0.0184	<0.0001	0.00010	0.00020	0.0125	0.000650	0.0001		1.61	<0.00002	
2/21/2017	Total	7.77	2846			103	<0.4	Not Measured	11.4	18.0	14.8	288	131	0.1030	0.579	0.00058	1.03	5.38	0.00112	141	0.017	0.00055	0.00877	0.00007	0.00003	0.00022	0.0413	0.000100	0.0003		1.04	0.0004	
6/27/2016	Total	7.77	3670	65.3	29.7	151	<5	0.09	3.8		20.4	397	179	0.0317	0.896	0.00074	0.292	7.18	<0.001	214	0.0094	0.00057	0.00994	0.00001	0.00004	0.00019	0.0288	0.000096	0.0002		1.41	0.00004	
9/13/2017	Total	7.00	4159	237.0	21.8	223	<5	No Flow	0.3	< 90	24.0	428	206	0.0094	1.13	0.00113	0.192	7.88	0.00020	263	0.002	0.00076	0.0145	0.00003	<0.00002	0.00025	0.0005	0.000080	0.0001		1.65	0.00010	
11/8/2017	Total	6.58	2716	225.3	18.6			Dipped	2.60	< 90	15.9	263	125	0.0487	0.718	0.00071	0.201	2.01	0.00030	143	0.006	0.00054	0.00887	0.00002	0.00004	0.00016	0.0107	0.000192	0.0003	2.97	1	0.00004	
2/7/2018	Total	8.20	1805	96.1	3.0	85.8	< 5	Dipped	4.00	< 90	11.6	203	73.6	0.0227	0.479	0.00061	0.081	2.61	0.00022	72.6	0.005	0.00045	0.00589	0.00001	0.00002	0.00016	0.0116	0.000052	0.0004		0.850	0.00003	1.78
5/2/2018	Total	6.70	2970	245.0	28.2	89.3	< 5	0.0660	2.20	< 2	15.8	337	123	0.261	1.12	0.00080	0.474	7.10	0.00007	141	0.0390	0.00061	0.0208	0.000268	0.00023	0.00023	0.0663	0.000051	0.0019		1.00	0.000080	12.3
7/11/2018	Total	7.30	4200	118.4	29.7	172	< 5	0.0132	1	< 2	21.8	445	190	0.0117	1.43	0.00069	0.242	9.03	0.0001	231	0.0071	0.00043	0.00861	0.00004	0.00004	0.00022	0.0339	0.00002	0.0001		1.59	0.00005	11.7
10/17/2018	Total	6.70	4170	141.1	17.3	152	< 8	0.0396	2.00	< 2	24.8	425	201	0.0259	1.57	0.0002	0.189	6.31	< 0.001	249	0.010	0.00047	0.0062	0.00007	0.00004	0.00020	0.0349	< 0.00006	0.0002		1.58	< 0.0003	13.3
2/13/2019	Total	6.40	3310	70.2	4.2	113	< 8	0.04840	4.80	3.00	19.6	344	137	0.452	1.47	0.00082	0.952	15.4	< 0.0008	200	0.0428	0.00063	0.0187	0.000307	0.00021	0.00020	0.0773	0.00009	0.0015		1.15	< 0.0002	13.9
5/15/2019	Total	7.10	3540	2.5	23.3	110	< 8		2.70	< 2	24.6	375	131	0.146	1.83	0.00046	0.614	11.1	< 0.0008	219	0.0274	0.00034	0.0153	0.000200	0.00015	0.00030	0.0643	< 0.00004	0.0008		1.19	< 0.0002	13.5
8/21/2019	Total	6.70	4130	35.5	23.1	139	< 8	0.02200	0.60	< 2	32.2	445	178	0.030	2.04	0.00100	0.040	7.92	< 0.002	295	0.0050	0.0004	0.00596	< 0.0001	< 0.00005	0.00020	0.0304	< 0.0002	< 0.0002		1.58	< 0.0005	11.0
11/20/2019	Total	6.20	4180	47.3	9.0	129	< 8	0.00880	2.80	< 2	34.5	453	189	0.010	1.71	0.00030	0.138	2.51	< 0.0004	307	0.0030	0.00038	0.00556	< 0.00002	0.00002	0.00010	0.0202	< 0.00005	0.0001		1.63	< 0.0001	11.6
2/19/2020	Total	6.71	2700	49.4	8.7	76.2	< 8		3.00	< 2	23.0	324	126	0.137	1.39	0.00060	0.709	10.5	< 0.0004	205	0.0268	0.00036	0.00874	0.000100	0.00010	0.00020	0.0642	0.00009	0.0005		1.11	< 0.0001	10.6
4/29/2020	Total	7.55	2710	-20.6	20.8	74.1	< 8	0.02640	2.00	< 2	25.8	336	107	0.167	1.55	0.00050	0.495	9.43	< 0.0004	235	0.0236	0.00037	0.01600	0.000128	0.00017	0.00010	0.0517	< 0.00005	0.0009		1.07	0.00010	11.9
CIP took over sampling																																	
9/23/2020	Total	7.19	2747	13	21.57	102.0	-88.5																										
11/25/2020	Total	7.29	4590	159	7.88	130.0	-142.0																										
1/15/2021	Total	6.99	3200	128	2.14			Dipped (No Flow)	20																								
4/1/2021	Total	6.79	4010	143	9.09	96.00	38	Dipped (No Flow)	2.00		31.0	390	180	<0.047		<0.0035	0.17	3.7	<0.0049	270	<0.0097	<0.0041	0.0061	<0.00060	0.00071	<0.00063	0.026	<0.0028	<0.0060	4.8	1.4	0.00570	
8/17/2021	Total	8.45	3750	261	23.59	110.00	-112	Dipped (No Flow)	4.00	<0.13	36.0	380	170	<0.034	2	<0.0017	0.17	1.1	<0.0011	300	<0.015	<0.00075	0.0034	<0.00062	<0.00020	<0.0025	0.012	<0.00045	<0.00089	4.9	1.5	<0.00020	11
12/10/2021	Total	5.50	1930	113	13.65	85.00	-35.2	Dipped (No Flow)	5.60	<0.13	33.0	380	160	0.050	2.2	<0.00063	0.33	7.6	<0.00061	270	0.021	0.00038	0.0048	<0.00018	<0.00022	<0.0015	0.032	<0.00013	<0.0015	5.9	1.4	<0.00015	13
3/7/2022	Total	6.47	5130	180	13.55	240	-155	Dipped (No Flow)	2.90	<0.13	43.0	480	220	0.059	2	<0.0011	0.75	43	<0.00061	400	0.0091	<0.00028	0.0110	<0.00027	<0.00022	<0.0015	0.044	<0.00017	0.00076	7.3	2	<0.00047	16
4/5/2022	Total	7.05	2590	-11	12.48	91.00	-74	Dipped (No Flow)	9.10	<0.13	12.0	280	98	0.200	0.78	<0.0011	1	5.5	<0.00061	110	0.024	0.00066	0.0180	<0.00027	0.00022	<0.0015	0.035	0.00017	<0.00074	5.4	0.92	<0.00047	12
8/11/2022	Total					130.00	<5.0	Dipped (No Flow)	5.00	<0.13	39.0	380.0	150	<0.034	1.700	<0.0017	0.1700	12	<0.0011	270	<0.015	<0.00075	0.0054	<0.00062	<0.00020	<0.0025	0.021	<0.00045	<0.00089	3.9	1.5	<0.00020	8.3
10/13/2022	Total	6.49	3920	198	15.01	120.00	-56.6	Dipped (No Flow)	7.00	<0.13	40.0	370.0	150	<0.034	1.800	<0.0017	0.1500	3.4	<0.0011	270	<0.015	<0.00075	0.0041	<0.00062	<0.00020	<0.0025	0.014	<0.00045	<0.00089	4.7	1.3	<0.00020	10.0
3/1/2023	Total	5.87	4020	179	9.64	110.00	-21	Dipped (No Flow)	3.40	<0.13	39.0	390.0	160	0.041	1.900	<0.0017	0.4200	9.6	<0.0011	290	<0.015	<0.00075	0.0053	<0.00062	<0.00020	<0.0025	0.030	<0.00045	<0.00089	4.9	1.3	<0.00020	11.0
4/19/2023	Total	7.04	4330	186	18.82	120.00	-144	Dipped (No Flow)	4.60	<0.13	43.0	390.0	150	<0.034	2.200	<0.0017	0.5900	8.8	0.0011	290	<0.015	<0.00075	0.0060	0.00100	<0.00020	<0.0025	0.034	<0.00045	0.00140	4.0	1.4	0.00045	8.50
9/6/2023	Total	5.83	4280	181	22.36	95.00	-7.95	Dipped (No Flow)	3.20	<0.13	43.0	380.0	150	<0.034	2.000	<0.0017	<0.047	0.66	<0.0011	290	<0.015	<0.00075	0.0033	<0.00062	<0.00020	<0.0025	0.0047	<0.00045	<0.00089	5.6	1.4	<0.00020	12.0
12/6/2023	Total	7.33	4000	105	7.64	100.00	-457	Dipped (No Flow)	5.70	<0.13	40.0	380.0	150	0.160	1.700	<0.0017	1.1000	4.2	<0.0011	270	0.036	<0.00075	0.0053	<0.00062	<0.00020	<0.0025	0.038	<0.00045	<0.00089	5.6	1.4	<0.00020	12.0
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																	
5/17/2024	Total	6.68	3080	145	19.35	85.00	-71.6	Dipped (No Flow)	4.50	<0.13	31.0	330.0	91	<0.034	1.700	<0.0017	0.3000	9.2	<0.0011	180	0.015	<0.00075	0.0075	<0.00062	<0.00020	<0.0025	0.035	<0.00045	0.00110	4.7	1.1	<0.00020	10.0

Record of Duplicates

SAMPLING DATE	pretreatment	pH	Cond	Redox	Temperature	Alkalinity	Acidity	Water flow	TSS	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	Si	Sr	Tl	SiO2
6/24/2016	Total	7.21	3880.00		24	165.43	0	Not measured		2.00	19	361.3	170.9	<0.03	0.761	<0.002	0.0341	4.1168	<0.001	203.4360	<0.001	<0.009	0.1148	<0.0004	<0.0004	0.0017	0.0148	<0.004	<0.012	4.105	1.552	<0.003	
Duplicate											20.200	425.00	215	0	0.7840	0.001	0.058	4.560	<0.0002	233.000	0.0	0.001	0.00715	<0.00002	<0.00002	0.000	0.014	0.001	<0.0002		1.46	<0.0001	

Oxford Pond dissolved

SAMPLING DATE	pretreatment	TDS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ppt	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	SiO2 mg/L
Background																													
Sample Size		13	4		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	20	13	13	13	13	
Average of detected		1232	0		1013	99	4.4	166	86	<0.03	0.072	<0.002	0.06	2.2	0.0027	10	0.017	<0.009	0.036	<0.0004	0.00052	0.0048	0.022	<0.004	<0.012	1.8	0.7	0.0074	
Std Dev. Of detected		616	NA		564	107	1.4	61	30	NA	0.017	NA	0.06	1.6	0.0007	4	0.011	NA	0.013	NA	0.00002	0.0007	0.012	NA	NA	0.7	0.3	0.0007	
Maximum of Detected		1865	0		2495	349	6.5	242	171	<0.03	0.109	<0.002	0.23	5.4	0.0038	16	0.034	<0.009	0.064	<0.0004	0.00053	0.0066	0.040	<0.004	<0.012	3.0	1.0	0.0082	
Median of Detected		1478	0		1056	59	4.5	174	89	<0.03	0.078	<0.002	0.03	2.4	0.0025	10	0.015	<0.009	0.035	<0.0004	0.00052	0.0048	0.019	<0.004	<0.012	1.8	0.7	0.0071	
Minimum of Detected		27	0		179	3	1.9	28	18	<0.03	0.040	<0.002	0.01	0.4	0.0013	2	0.004	<0.009	0.009	<0.0004	0.00050	0.0031	0.006	<0.004	<0.012	0.3	0.1	0.0066	
% of Detected		100	0		100	100	100	100	100	0	100	0	92	100	85	100	69	0	100	0	15	92	100	0	0	100	100	23	
DL										<0.03		<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001		<0.004	<0.012			<0.003	
11/22/2009	Dissolved	1582		15	1056	228	6.5	222	121	<0.04	0.085	<0.002	0.138	0.36	0.003	15.6	0.015	<0.007	0.037	<0.0005	0.0005	0.005	0.007	<0.004	<0.012	1.71	1.02	<0.007	
3/22/2010	Dissolved	622		7	390	28	2.2	89	43	<0.04	0.041	<0.002	0.011	4.68	0.004	4.6	0.010	<0.007	0.021	<0.0005	<0.0003	0.005	0.040	<0.004	<0.012	0.79	0.36	NA	
4/19/2010	Dissolved	1721		12	1121	213	5.5	225	114	<0.04	0.077	<0.002	0.049	2.36	0.003	13.2	0.021	<0.007	0.046	<0.0005	<0.0003	0.004	0.036	<0.004	<0.012	1.61	1.00	<0.007	
5/17/2010	Dissolved	1478		18	827	349	5.0	196	99	<0.04	0.064	<0.002	0.068	1.54	0.003	11.2	0.007	<0.007	0.039	<0.0005	<0.0003	0.004	0.019	<0.004	<0.012	1.20	0.86	0.008	
7/2/2010	Dissolved	1625		31	1062	121	3.9	171	89	<0.04	0.096	<0.002	0.031	5.42	0.004	9.4	0.004	<0.007	0.035	<0.0005	<0.0003	0.006	0.030	<0.004	<0.012	1.96	0.68	NA	
8/5/2010	Dissolved	246		23	179	43	1.9	28	18	<0.04	0.040	<0.002	0.010	0.39	0.001	2.0	<0.002	<0.007	0.009	<0.0005	<0.0003	<0.001	0.006	<0.004	<0.012	0.32	0.10	<0.007	
8/27/2010	Dissolved	1457		18	905	20	5.6	242	119	<0.04	0.089	<0.002	<0.002	2.96	<0.001	13.5	0.010	<0.007	0.045	<0.0005	<0.0003	0.007	0.016	<0.004	<0.012	1.74	1.02	NA	
9/30/2010	Dissolved	1865		20	1129	94	5.2	201	97	<0.04	0.081	<0.002	<0.001	1.00	0.004	11.4	<0.002	<0.007	0.035	<0.0005	<0.0003	0.003	0.014	<0.004	<0.012	1.82	0.88	<0.007	
10/27/2010	Dissolved	1708		19	738	28	5.5	174	89	<0.04	0.081	<0.002	0.021	0.70	0.003	10.7	<0.002	<0.007	0.033	<0.0005	<0.0003	0.004	0.011	<0.004	<0.012	2.08	0.76	NA	
11/17/2010	Dissolved	1798	<0.10	20	1127	5.5	4.5	169	85	<0.04	0.081	<0.002	0.022	0.63	0.003	10.2	<0.002	<0.007	0.034	<0.0005	0.0005	0.003	0.014	<0.004	<0.012	2.24	0.72	0.007	
3/29/2011	Dissolved	1010	<0.10	18	637	3.1	3.8	153	80	<0.04	0.060	<0.002	0.025	3.12	0.002	7.6	0.034	<0.009	0.026	<0.0004	<0.0004	0.005	0.038	<0.004	<0.012	2.11	0.60	0.007	
5/20/2011	Dissolved	27	<0.10	16	2495	58.8	4.2	183	95	<0.03	0.078	<0.002	0.014	2.45	0.002	9.4	0.023	<0.009	0.064	<0.0004	<0.0004	0.005	0.036	<0.004	<0.012	2.97	0.68	NA	
7/7/2011	Dissolved	823	<0.10	17	1499	80.8	2.8	101	63	<0.03	0.066	<0.002	0.229	2.74	<0.001	6.2	0.009	<0.009	0.042	<0.0004	<0.0004	0.006	0.020	<0.004	<0.012	2.28	0.38	<0.003	
Reclamation Began																													
Sample Size		68	69	69	69	67	67	70	70	70	70	70	70	70	67	70	70	70	70	70	70	70	70	70	70	55	67	67	16
Average of detected		2443	0.55	255	1352	8.74	16.7	306	142	0.03	0.793	0.0012	0.0578	4.57	0.003	117.6	0.015	0.002	0.042	0.00010	0.00042	0.0030	0.034	0.001	0.001	4.03	1.21	0.0025	10.36
Std Dev. Of detected		686	0.62	218	369	16.87	12.3	81	34	0.02	0.715	0.0026	0.1064	4.84	0.001	109.5	0.012	0.004	0.054	0.00016	0.00072	0.0029	0.017	0.002	0.002	1.43	0.26	0.0030	1.74
Maximum of Detected		4000	3.53	670	2040	92.00	46.0	453	215	0.08	2.300	0.0128	0.5600	32.00	0.004	350.0	0.043	0.012	0.290	0.00060	0.00270	0.0120	0.078	0.007	0.006	6.90	1.80	0.0080	15.00
Median of Detected		2400	0.36	253	1332	3.28	11.7	304	140	0.02	0.508	0.0009	0.0260	2.92	0.002	139.5	0.010	0.000	0.017	0.00005	0.00017	0.0022	0.019	0.000	0.000	4.41	1.17	0.0002	11.00
Minimum of Detected		1011	0.17	10	338	0.10	3.6	125	66	0.00	0.064	0.0002	0.0005	0.04	0.000	8.5	0.001	0.000	0.003	0.00001	0.00001	0.0000	0.001	0.000	0.000	0.22	0.56	0.00000	8.20
% of Detected		99	54	100	100	52	100	100	99	24	100	34	53	99	60	100	66	33	100	20	31	73	100	14	30	100	100	27	100
DL										<0.03		<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001		<0.004	<0.012			<0.003	<0.004
8/10/2011	Dissolved	1623	<0.10	14	932	1.2	4.5	199	109	<0.03	0.094	<0.002	0.040	2.27	0.002	11.7	<0.001	<0.009	0.065	<0.0004	<0.0004	0.007	0.018	<0.004	<0.012	3.22	0.81	0.005	
9/15/2011	Dissolved	2254	<0.10	24	1381	5.0	8.1	298	158	<0.03	0.135	<0.002	0.052	9.87	0.002	19.8	0.005	<0.009	0.091	<0.0004	<0.0004	0.012	0.037	<0.004	<0.012	4.17	1.39	0.008	
10/5/2011	Dissolved	2121	<0.10	24	1413	3.1	7.4	291	149	<0.03	0.138	<0.002	<0.001	8.22	<0.001	19.2	0.006	<0.009	0.085	<0.0004	<0.0004	0.011	0.041	<0.004	<0.012	4.68	1.28	0.004	
11/16/2011	Dissolved	1376	3.53	21	924	4.7	5.8	213	111	<0.03	0.115	<0.002	<0.001	2.71	0.004	13.1	0.008	0.012	0.027	<0.0004	0.0006	0.006	0.028	<0.004	<0.012	3.12	1.05	<0.003	
12/29/2011	Dissolved	1156	<0.10	10	701	2.6	5.6	194	106	<0.03	0.089	<0.002	<0.001	2.13	<0.001	11.6	0.019	<0.009	0.026	<0.0004	<0.0004	0.005	0.033	<0.004	<0.012	3.62	0.93	<0.003	
1/30/2012	Dissolved	1535	<0.10	12	958	37.9	4.8	209	112	<0.03	0.102	<0.002	<0.002	4.95	0.004	11.7	0.039	<0.009	0.059	<0.0004	<0.0004	0.005	0.054	<0.004	<0.012	3.47	0.88	<0.003	
3/6/2012	Dissolved	1928	<0.10	13	1174	92.0	4.2	201	108	<0.03	0.110	<0.002	<0.001	6.20	0.001	12.3	0.023	<0.009	0.058	<0.0004	<0.0004	0.008	0.050	<0.004	<0.012	5.76	0.81	<0.003	
4/19/2012	Dissolved	1972	<0.10	16	1218	2.2	4.8	246	131	<0.03	0.124	0.013	<0.001	2.92	0.002	15.3	0.014	<0.009	0.073	<0.0004	0.0023	0.006	0.035	<0.004	<0.012	6.08	1.03	<0.003	
5/17/2012	Dissolved	1852	<0.10	26	1113	3.8	5.2	211	126	<0.03	0.116	<0.002	<0.001	2.76	0.002	16.1	0.008	<0.009	0.063	<0.0004	<0.0004	0.005	0.025	<0.004	<0.012	4.82	1.00	0.007	
6/13/2012	Dissolved	2244	<0.10	29	1332	<0.10	5.7	269	148	<0.03	0.135	<0.002	<0.002	2.92	0.002	19.1	0.003	<0.009	0.075	<0.0004	<0.0004	0.006	0.024	<0.004	<0.012	4.35	1.16	0.004	
7/26/2012	Dissolved	2042	<0.10	38	1237	4.1	6.7	229	157	<0.03	0.128	<0.002	<0.001	0.93	0.002	20.3	<0.001	<0.009	0.069	<0.0004	<0.0004	0.004	0.012	<0.004	<0.012	3.06	1.27	<0.003	
8/30/2012	Dissolved	2294	<0.10	36	1408	3.0	6.7	274	159	<0.03	0.124	<0.002	<0.001	0.11	0.002	20.3	<0.001	<0.009	0.070	<0.0004	<0.0004	0.003	0.012	<0.004	<0.012	2.07	1.24	0.006	
9/21/2012	Dissolved	2221	2.11	34	1385	3.3	7.1	236	136	<0.03	0.122	<0.002	0.006	0.26	0.002	18.9	0.035	<0.009	0.061	<0.0004	0.0010	0.005	0.014	<0.004	<0.012	2.59	1.17	0.004	
10/16/2012	Dissolved	2108	<0.10	27	1311	4.0	7.0	251	142	<0.03	0.129	<0.002	0.002	0.04	0.003	20.0	<0.001	<0.009	0.070	<0.0004	<0.0004	0.002	0.009	<0.004	<0.012	2.38	1.16	<0.003	
11/30/2012	Dissolved	1928	<0.10	25	1205	3.2	6.5	238	136	<0.03	0.121	<0.002	<0.001	<0.001	0.002	18.1	0.007	<0.009	0.040	<0.0004	<0.0004	0.002	0.009	<0.004	<0.012	2.27	1.12	<0.003	
12/19/2012	Dissolved	1743	<0.10	18	1084	2.2	6.4	228	124	<0.03	0.112	<0.002	<0.001	0.52	0.002	17.2	<0.001	<0.009	0.076	<0.0004	<0.0004	0.005	0.010	<0.004	<0.012	2.28	1.14	0.007	
2/19/2013	Dissolved	1011	<0.10	15	581	1.3	3.6	125	68	<0.03	0.064	<0.002	0.013	1.19	<0.001	8.5	<0.001	<0.009	0.040	<0.0004	<0.0004	0.001	0.005	<0.004	<0.012	1.41	0.56	<0.003	
3/14/2013	Dissolved	1335	<0.10	10	660	0.7	4.8	191	101	<0.03	0.091	<0.002	0.011	1.41	0.002	13.1	0.021	0.012	0.057	<0.0004	<0.0004	0.003	0.010	<0.004	<0.012	2.24	0.83	<0.003	
5/2/2013	Dissolved	1806	<0.10	25	1082	0.7	8.3	141	82	<0.03	0.106	<0.002	<0.001	0.49	0.004	24.1	<0.001	<0.009	0.042	<0.0004	<0.0004	0.004	0.011	0.007	<0.012	1.62	0.94	<0.004	
5/30/2013	Dissolved	1789	<0.10	25	1120	5.8	6.5	254	135	<0.03	0.109	<0.002	<0.001	1.18	<0.001	20.6	<0.001	<0.009	0.144	<0.0004	<0.0004	<0.001	0.011	<0.004	<0.012	1.20	1.07	<0.003	
6/27/2013	Dissolved	1513	<0.10	25	893	6.5	6.3	216	116	<0.03	0.108	<0.002	0.086	0.79	0.003	18.1	<0.001	<0.009	0.068	<0.0004	<0.0004	<0.001	0.005	<0.004	<0.012	2.04	0.89	<0.003	
8/1/2013	Dissolved	1685	<0.10	35	950	35	6.1	221	112	<0.03	0.146	<0.002	<0.001	0.47	0.004	20.9	0.011	0.011	0.086	<0.0004	0.0009	<0.001	0.010	<0.004	<0.012	4.02	0.89	<0.003	
8/28/2013	Dissolved	1896	<0.10	44	1034	8.1	5.8	229	117	<0.03	0.171	<0.002	<0.001	2.84	0.002	24.0	0.011	<0.009	0.099	<0.0004	<0.0004	<0.001	0.009	<0.004	<0.012	5.06	0.91	<0.003	
10/4/2013	Dissolved	1997	<0.10	57	1213	1.4	7.1	261	136	<0.03	0.177	<0.002	<0.001	1.56	0.002	32.6	<0.001	<0.009	0.034	<0.0004	<0.0004	0.003	0.006	<0.004	<0.012	5.38	1.13	<0.003	
11/20/2013	Dissolved	1876	<0.10	66	1159	5.4	7.4	253	138	<0.03	0.172	<0.002	0.005	1.00	0.003	38.4	<0.001	<0.009	0.068	<0.0004	<0.0004	0.003	0.005	<0.004	<0.012	5.17	1.13	<0.003	
12/27/2013	Dissolved																												
1/20/2014	Dissolved																												
2/27/2014	Dissolved	1512	<0.10	46	887	21.6	6.0	221	95	<0.03	0.185	<0.002	<0.001	3.31	0.002	25.4	0.036	<0.009	0.290	<0.0004	0.0004	0.004	0.021	<0.004	<0.012	4.41	0.86	<0.003	
4/1/2014	Dissolved	1872	<0.10	84	1181	<0.2	6.8	247	124	<0.03	0.189	<0.002	0.021	2.76	<0.001	44.7	0.004	<0.009	0.284	<0.0004	<0.0004	0.003	0.018	<0.004	<0.012	4.25	1.06	<0.003	
6/10/2014	Dissolved	2369	<0.10	200	1406	1.6	9.9	297	145	<0.03	0.421	<0.002	<0.001	6.16	0.001	103	<0.001	<0.009	0.065	<0.0004	0.0027	0.008	0.034	<0.004	<0.012	5.13	1.21	<0.003	
7/8/2014	Dissolved	2725	<0.10	253	1596	7.9	10.7	326	158	<0.03	0.443	<0.002	<0.001	6.77	<0.001	123	0.007	<0.009	0.068	<0.0004	<0.0004	0.006	0.028	<0.004	<0.012	4.81	1.40	<0.003	
7/31/2014	Dissolved	2953	<0.10	297	1760	0.1	10.3	334	177	<0.03	0.483	<0.002	0.001	6.46	0.002	126	0.001	<0.009	0.130	<0.0004	<0.0004	0.003	0.026	<0.004	0.006	4.52	1.38	<0.003	
9/4/2014	Dissolved	2721	<0.10	300	1700	0.1	9.9	297	146	<0.03	0.428	<0.002	0.001	1.53	0.002	124	0.001	<0.009	0.046	<0.0004	<0.0004	0.002	0.012	<0.004	0.006	3.61	1.27	<0.003	
10/6/2014	Dissolved	3121	<0.10	327	1841	0.7	12.6	343	172	<0.03	0.483	<0.002	0.014	0.30	0.003	148	0.001	<0.009	0.052	<0.0004	<0.0004	0.002	0.004	<0.004	0.006	3.35	1.54	<0.003	
10/30/2014	Dissolved	3088	<0.10	327	1863	2.8	11.7	310	154	<0.03	0.466	<0.002	0.005	1.01	0.002	135	<0.001	<0.009	0.053	<0.0004	<0.0004	0.001	0.006	<0.004	<0.012	3.42	1.38	<0.003	
4/2/2015	Dissolved	1635	1.02	128	945	5.4	8.3	218	99	<0.03	0.305	<0.002	<0.001	4.58	0.002	76.3	0.010	<0.009	0.040	<0.0004	<0.0004	0.0019	0.033	<0.004	<0.012	3.65	0.85	<0.003	
5/27/2015	Dissolved	2929	1.34	262	1636	<0.2	14.5	316	154	<0.03	0.532	<0.002	<0.001	4.98	<0.001	146	0.023	<0.009	0.049	<0.0004	0.0007	0.004	0.029	<0.004	<0.012	4.45	1.31	<0.003	
9/9/2015	Dissolved	2992	0.96	297	1840	<0.2	14.5	344	159	<0.03	0.637	<0.002	0.003	2.10	0.002	157	<0.001	<0.009	0.120	0.0006	<0.0004	0.0017	0.013	<0.004	<0.012	5.53	1.40	<0.003	
1/7/2016	Dissolved																												
3/28/2016	Dissolved																												
6/24/2016	Dissolved	3272	0.56	348	1949	5	16.8	322	155	<0.03	0.689	<0.002	0.011	3.64	0.002	182	0.002	<0.009	0.103	<0.0004	<0.0004	0.0012	0.014	<0.004	<0.012	3.75	1.38	<0.003	
6/27/2016	Dissolved	3230	0.39	341	1805	<5	20.3	407	215	0.006	0.791	0.005	0.004	4.30	0.0002	227	0.005	0.0006	0.007	<0.00002	<0.00002	0.0002	0.015	0.00012	<0.0002		1.48	<0.0001	
7/22/2016	Dissolved	3096	0.30	95	338	2	23.2	360	183	<0.03	0.822	<0.002	0.007	3.45	0.002	220	<0.001	<0.009	0.029	<0.0004	<0.0004	0.0036	0.009	<0.004	<0.012	5.66	1.52	<0.003	
8/23/2016	Dissolved	3290	0.38	358	1750		21.2	400	189	0.004	0.793	0.001	0.023	2.40	0.0004	239	0.007	0.0006	0.005	<0.000005	0.00002	0.0001	0.008	0.00035	0.0002	4.76	1.56	0.00005	
OSU Sampling Ended.																													
12/6/2016	Dissolved	3190	0.36	361	1710	< 90	22.4	397	210	0.0079	1.020	0.0007	0.026	2.95	0.0012	249	0.006	0.0009	0.007	0.000010	0.000010	0.0002	0.0113	0.000560	0.0002	6.25	1.54	<0.00002	
2/21/2017	Dissolved	2200	0.32	212	1260	5.0	14.6	289	125	0.0192	0.533	0.0006	0.101	3.59	0.0005	139	0.011	0.0004	0.004	0.000020	0.000030	0.0002	0.0357	0.000041	0.0001		1.03	0.00015	
6/14/2017	Dissolved	3200	0.35	362	1820	< 2	19.4	376	166	0.0199	0.858	0.0017	0.008	6.66	<0.001	203	0.012	0.0006	0.011	0.000011	0.000040	0.0003	0.0284	0.000020	0.0002		1.34	0.00004	
9/13/2017	Dissolved	3560	0.38	483	2040	< 90	24.8	443	210	0.0092	1.150	0.0012	0.022	8.17	0.0002	276	0.005	0.0007	0.014	0.000020	<0.00002	0.0000	0.0005	0.000080	<0.0001	4.95	1.71	0.00007	
11/8/2017	Dissolved					< 90	16.3	263	123	0.0107	0.739	0.0008	0.029	2.07	0.0002	143	0.010	0.0005	0.008	0.000010	0.000040	0.0001	0.0109	0.000047	0.0002		1.00	0.00003	
2/7/2018	Dissolved		0.24	137	739	< 90	10.3	188	68.2	0.0059	0.380	0.0011	0.018	2.32	0.0002	66.6	0.006	0.0004	0.006	0.000009	0.000110	0.0002	0.0115	0.000010	0.0004		0.785	0.00003	
5/2/2018	Dissolved	2400	0.47	322	1360	< 2	18.2	375	147	0.0234	1.17	0.0006	0.069	7.71	0.0001	153	0.040	0.0005	0.022	0.000194	0.000230	0.0001	0.0670	0.000007	0.0013		1.12	0.000075	
7/11/2018	Dissolved	3500	0.52	550	1860	< 2	21.2	440	193	0.0324	1.49	0.0006	< 0.002	8.77	0.0001	224	0.008	0.0005	0.009	0.000040	0.000040	0.0002	0.0353	< 0.000008	0.0002		1.57	0.00005	
10/17/2018	Dissolved	3400	0.53	541	1660		25.5	435	202	0.0090	1.670	0.0002	< 0.003	6.42	< 0.001	253	0.010	0.0005	0.006	0.000060	0.000050	0.0002	0.0358	< 0.00006	0.0002		1.62	< 0.0003	
2/13/2019	Dissolved	2550	0.43	432	1240		19.2	340	130	0.0750	1.430	0.0008	0.383	15.50	< 0.0008	193	0.043	0.0005	0.019	0.000232	0.000210	0.0002	0.0782	< 0.00004	0.0010		1.14	< 0.0002	
5/15/2019	Dissolved	2840	0.38	483	1380	< 2	24.2	387	126	0.0176	1.820	0.0004	0.084	11.20	< 0.0008	217	0.028	0.0003	0.016	0.000100	0.000170	0.0002	0.0651	< 0.00004	0.0004		1.19	< 0.0002	
8/21/2019	Dissolved	3400	0.42	571	1630	< 2	32.8	453	180	< 0.020	2.080	0.0010	< 0.02	8.07	< 0.002	300	0.006	0.0004	0.006	< 0.0001	< 0.00005	< 0.0002	0.0303	< 0.0002	0.0002		1.62	< 0.0005	11.0
11/20/2019	Dissolved	3480	0.35	614	1710	< 2	33.8	443	182	< 0.005	1.690	0.0003	< 0.02	2.30	< 0.0004	297	0.003	0.0003	0.005	< 0.00002	0.000020	0.0002	0.0203	< 0.00005	0.0001		1.58	< 0.0001	11.600
2/19/2020	Dissolved	2510	0.35	475	1220	< 2	22.9	322	126	0.0254	1.360	0.0007	0.060	10.60	< 0.0004	201	0.028	0.0003	0.008	0.000070	0.000120	0.0001	0.0637	< 0.00005	0.0004		1.11	< 0.0001	10.600
4/29/2020	Dissolved	2540	0.32	456	1240	< 2	25.1	324	103	0.0200	1.540	0.0005	< 0.02	9.46	< 0.0004	221	0.024	0.0003	0.017	0.000080	0.000160	0.0002	0.0517	< 0.00005	0.0007		1.04	0.0001	
CIP took over sampling																													
9/23/2020	Dissolved	1930	0.172	211	1190	<0.2		250	99	<0.05	0.642	<0.002	<0.1	0.0408		205	0.020	<0.005	0.0102	<0.001	<0.001	<0.002	0.00376	<0.001	0.0013	0.22			
11/25/2020	Dissolved	2800	<0.5	670	1800	<0.2		430	210	<0.05	1.900	<0.002	<0.1	0.6300		340	<0.02	<0.005	0.0063	<0.001	<0.001	<0.002	0.0064	<0.001	<0.005	2.80			
1/15/2021	Dissolved	2200	0.25	420	1200	<0.13		290	140	<0.034	1.300	0.0027	0.05	1.5000		220	<0.015	<0.00075	0.0059	<0.00031	<0.00020	<0.00098	0.015	<0.00045	<0.00089				8.2
4/1/2021	Dissolved	2800	0.36	560	1500	<0.13	32	350	170	<0.034	1.900	<0.0017	0.067	3.8000	<0.0049	260	<0.015	<0.00075	0.0050	<0.00031	<0.00020	0.002	0.022	<0.00045	<0.00089	5.00	1.40	<0.0027	11
8/17/2021	Dissolved	3300	0.45	620	1800	<0.13	36	380	170	<0.034	1.900	<0.0017	<0.047	0.9800	<0.0011	290	<0.015	<0.00075	0.0033	<0.00062	<0.00020	<0.0025	0.011	<0.00045	<0.00089	4.70	1.40	<0.00020	10
12/10/2021	Dissolved	3100	0.40	400	1300	<0.13	28	310	130	0.025	1.700	0.0013	0.069	5.9000	<0.00061	220	0.0091	<0.00031	0.0039	<0.00018	<0.00022	<0.0015	0.025	<0.00013	<0.0015	4.60	1.10	<0.00015	9.9
3/7/2022	Dissolved	4000	0.39	660	1900	<0.13	42	420	190	0.043	2.100	0.0017	0.56	32.000	<0.00061	350	0.017	0.00028	0.013	<0.00027	<0.00022	<0.0015	0.055	<0.00017	<0.00074	6.90	1.80	<0.00047	15
4/5/2022	Dissolved	1800	0.36	170	1100	<0.13	15	310	110	<0.016	0.990	0.0013	0.032	6.400	<0.00061	140	0.022	0.00045	0.017	<0.00027	<0.00022	<0.0015	0.033	<0.00017	<0.00074	5.20	1.00	<0.00047	11
8/11/2022	Dissolved	2500	0.35	500	1500	<0.13	39	380	150	<0.034	1.700	0.0027	<0.047	12.00	<0.0011	270	<0.015	<0.00075	0.005	<0.00062	<0.00020	<0.0025	0.02	<0.00045	<0.00089	3.80	1.40	<0.00020	8.2
10/13/2022	Dissolved	2400	0.30	520	1500	<0.13	39	360	140	<0.034	1.800	0.0025	<0.047	2.90	<0.0011	270	<0.015	<0.00075	0.0032	<0.00062	<0.00020	<0.0025	0.014	<0.00045	<0.00089	4.70	1.20	<0.00020	10
3/1/2023	Dissolved	3000	0.22	520	1500	<0.13	39	400	160	<0.034	2.000	<0.0017	0.059	9.70	<0.0011	290	<0.015	<0.00075	0.0050	<0.00062	<0.00020	<0.0025	0.034	<0.00045	<0.00089	4.90	1.40	<0.00020	11
4/19/2023	Dissolved	3300	0.30	570	1700	<0.13	46	410	160	<0.034	2.300	<0.0017	0.053	9.10	<0.0011	310	<0.015	<0.00075	0.0062	<0.00062	<0.00020	<0.0012	0.036	<0.00045	0.00096	4.00	1.50	<0.00020	8.6
9/6/2023	Dissolved	3000	0.27	540	1600	<0.13	44	390	150	<0.034	2.000	<0.0017	0.081	0.74	<0.0011	300	<0.015	0.00079	0.0031	<0.00062	<0.00020	<0.0012	0.0052	<0.00045	<0.00089	5.70	1.40	0.00024	12
12/6/2023	Dissolved	2800	0.26	550	1700	<0.13	44	410	160	<0.034	1.800	<0.0017	<0.047	3.40	<0.0011	290	0.035	<0.00075	0.0044	<0.00062	<0.00020	<0.0012	0.038	<0.00045	<0.00089	6.00	1.50	<0.00020	13
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																													
5/17/2024	Dissolved	2800	0.27	350	1200	<0.13	34	360	96	<0.034	1.800	<0.0017	0.062	9.00	<0.0011	200	0.017	<0.00075	0.0078	<0.00062	<0.00020	<0.0012	0.036	<0.00045	0.0011	5.00	1.10	<0.00020	11

Record of Duplicates

6/24/2016		3200	0.40	340	1800	<0.005	20.4	403	217	0.010	0.802	0.0097	0.004	4.34	0.0002	229	0.005	0.00058	0.00718	<0.00002	<0.00002	0.0003	0.0154	0.000177	<0.0002		1.50	<0.0001	
Duplicate		3260	0.38	342	1810	<0.005	20.2	410	212	0.0030	0.779	0.00034	<0.002	4.25	<0.0002	224	0.005	0.00053	0.00710	<0.00002	<0.00002	0.0001	0.0144	0.000062	<0.0002		1.45	<0.0001	

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0.00000

SW-02 (Phases I and II East Pond, discontinued) Total

SAMPLING DATE	Type	Field Measurements pH	Field Measurements Cond microS/cm	Hg ppt	P mg/L	K mg/L	Ca mg/L	Mg mg/L	S mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Co mg/L	Cr mg/L	Li mg/L	Ni mg/L	Pb mg/L	Sb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	V mg/L
Background																																
Sample Size		13	12	12	13	13	13	13	13	13	13	15	13	13	15	13	13	13	13	13	13	13	13	15	13	17	13	15	13	13	9	12
Average of detected		7.16	149	455	0	1	13.554	5.6	9	0	0	0.00	0.377	0.32	0.0	1.76	0.008	0	0.01	0.00056	0.000	0.001	0.00177	0.0137	0.0021	0.004	0.012	<0.012	1.214	0.04	0.01	0.00
Std.Dev. Of detected		0.25	25	836	0	1	2.464	1.0	3	0	0	NA	0.502	0.37	0.0	0.42	0.003	NA	0.00	NA	0.000	0.000	0.00052	0.0100	0.0007	NA	0.004	NA	0.488	0.01	0.00	0.00
Maximum of Detected		7.69	178	2950	0	3	16.795	6.6	14	0	0	0.00	2.017	1.09	0.0	2.59	0.011	0	0.03	0.00056	0.001	0.001	0.00250	0.0208	0.0031	0.004	0.017	<0.012	2.021	0.05	0.01	0.01
Median of Detected		7.14	153	121	0	1	13.845	5.5	9	0	0	0.00	0.224	0.15	0.0	1.83	0.009	0	0.01	0.00056	0.000	0.001	0.00161	0.0137	0.0022	0.004	0.011	<0.012	1.239	0.04	0.01	0.00
Minimum of Detected		6.67	82	4	0	1	7.514	2.9	6	0	0	0.00	0.125	0.02	0.0	0.65	0.005	0	0.01	0.00056	0.000	0.001	0.00114	0.0066	0.0010	0.004	0.007	<0.012	0.360	0.02	0.01	0.00
% of Detected		100	100	100	69	100	100	100	100	31	100	7	100	100	33	100	23	8	100	8	31	46	54	13	85	6	77	0	100	100	22	33
DL					<0.03					<0.03		<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001	<0.001			<0.004		<0.012			<0.003	
11/27/2009	Total	7.18		399	0.204	2.4	16.1	6.4	6.1	0.42	0.037	<0.002	2.017	0.932	0.001	1.90	0.011	<0.007	0.026	<0.0005	0.0006	<0.0008	0.003	0.021	0.001	0.004	0.017	<0.012	1.67	0.048	<0.007	0.0043
12/27/2009	Total																															
1/26/2010	Total																															
2/5/2010	Total																															
3/22/2010	Total	7.13	132	21	0.068	1.7	14.0	5.5	10.0	0.06	0.024	<0.002	0.341	0.310	0.001	1.43	0.005	<0.007	0.013	<0.0005	<0.0003	0.0010	<0.001	<0.017	0.003	<0.004	<0.007	<0.012	1.06	0.041		<0.0015
4/19/2010	Total	7.51	153	30	<0.004	1.3	16.8	6.6	13.2	<0.04	0.024	<0.002	0.194	0.146	<0.001	1.88	<0.002	<0.007	0.011	<0.0005	<0.0003	0.0010	<0.001	<0.017	0.002	<0.004	0.016	<0.012	1.14	0.046	<0.007	<0.0015
5/17/2010	Total	7.20	170	1001	<0.004	1.2	16.4	6.5	12.2	<0.04	0.023	<0.002	0.383	0.062	<0.001	1.84	<0.002	<0.007	0.013	0.0006	0.0004	0.0009	<0.001	<0.017	0.001	<0.004	0.008	<0.012	0.70	0.046	<0.007	<0.0015
6/30/2010	Total														<0.001									<0.017		<0.004						
7/2/2010	Total														<0.001									<0.017		<0.004						
8/5/2010	Total	6.89	139	2950	0.007	1.4	13.0	5.5	9.2	<0.04	0.052	<0.002	0.286	0.046	<0.001	1.80	<0.002	<0.007	0.015	<0.0005	<0.0003	<0.0008	<0.001	<0.017	0.003	<0.004	0.007	<0.012	0.68	0.039		<0.0015
8/23/2010	Total	7.00	155	4	0.008	1.4	13.8	6.1	8.0	0.04	0.037	<0.002	0.309	0.030	<0.001	1.92	<0.002	<0.007	0.011	<0.0005	<0.0003	<0.0008	<0.001	<0.017	0.001	<0.004	0.011	<0.012	0.94	0.040		0.0043
9/30/2010	Total	7.26	153	127	0.026	1.3	14.3	5.9	7.5	0.07	0.038	<0.002	0.399	0.322	0.002	1.83	<0.002	<0.007	0.017	<0.0005	<0.0003	<0.0008	0.002	<0.017	0.003	<0.004	0.008	<0.012	1.24	0.040	<0.007	0.0038
10/27/2010	Total	7.14	172	19	0.058	2.7	12.5	5.1	6.6	<0.04	0.035	<0.002	0.214	1.087	0.001	1.74	<0.002	<0.007	0.017	<0.0005	0.0005	0.0013	0.002	<0.017	<0.001	<0.004	0.010	<0.012	1.28	0.034		<0.0015
11/17/2010	Total	6.67	178		0.045	0.7	12.4	5.1	7.4	<0.04	0.027	<0.002	0.126	0.707	<0.001	1.65	<0.002	<0.007	0.013	<0.0005	0.0004	0.0012	0.002	<0.017	0.002	<0.004	0.009	<0.012	1.50	0.034	<0.007	<0.0015
12/15/2010	Total											<0.002														<0.004		<0.012				
1/25/2011	Total											<0.002														<0.004		<0.012				
2/22/2011	Total	7.15	82	370	0.017	0.9	7.5	2.9	6.1	<0.04	0.017	<0.002	0.224	0.444	<0.001	0.65	<0.002	0.008	0.010	<0.0005	<0.0004	0.0014	<0.001	<0.017	<0.001	<0.004	<0.007	<0.012	0.36	0.021	<0.007	0.0051
3/29/2011	Total	7.69	164	356	0.036	1.4	15.0	6.2	11.3	<0.04	0.036	<0.002	0.125	0.077	0.002	1.86	<0.002	<0.009	0.012	<0.0004	<0.0004	<0.001	0.001	0.007	0.003	<0.004	<0.007	<0.012	2.02	0.044	0.011	<0.003
5/20/2011	Total	7.07	149	63	<0.03	1.2	12.9	5.5	13.6	<0.03	0.034	0.004	0.148	0.028	<0.001	2.59	0.009	<0.009	0.012	<0.0004	<0.0004	<0.001	0.001	<0.006	0.002	<0.004	0.015	<0.012	1.94	0.044	<0.003	
7/7/2011	Total	7.14	145	114	<0.03	1.2	11.3	5.0	11.8	<0.03	0.033	<0.002	0.142	0.024	<0.001	1.80	<0.002	<0.009	0.010	<0.0004	<0.0004	<0.001	0.002	<0.006	0.003	<0.004	0.015	<0.012	1.24	0.038	0.006	<0.003
Reclamation Began																																
Sample Size		11	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Average of detected		7.5	364	4	0	2	43.034	16.0	49	0	0	<0.002	0.236	0.88	0	4.1	0.0097	0	0.03	<0.0004	0.00	0.0020	0.0026	0.023	0.005	<0.004	0.02	<0.012	4.004	0.13	0.0	0.01
Std.Dev. Of detected		0.3	162	2	0	1	26.475	5.2	27	NA	0	NA	0.228	0.64	0	2.1	0.0030	NA	0.02	NA	0.00	0.0005	0.0008	0.015	0.002	NA	0.01	NA	0.804	0.06	0.0	0.01
Maximum of Detected		8.1	745	7	0	5	102.585	22.4	104	0	0	<0.002	0.779	2.03	0	9.2	0.0119	0	0.07	<0.0004	0.00	0.0027	0.0043	0.050	0.009	<0.004	0.03	<0.012	5.106	0.24	0.0	0.02
Median of Detected		7.5	342	3	0	2	33.042	16.7	47	0	0	<0.002	0.121	0.81	0	3.3	0.0108	0	0.02	<0.0004	0.00	0.0020	0.0024	0.015	0.005	<0.004	0.02	<0.012	4.133	0.12	0.0	0.01
Minimum of Detected		7.1	137	1	0	0	11.512	5.1	10	0	0	<0.002	0.039	0.02	0	1.9	0.0054	0	0.01	<0.0004	0.00	0.0013	0.0017	0.012	0.001	<0.004	0.01	<0.012	2.229	0.04	0.0	0.00
% of Detected		100	100	100	18	100	100	100	100	9	100	0	100	100	64	100	36	9	100	0	27	45	100	82	100	0	100	0	100	100	18	27
DL					<0.03					<0.03		<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001	<0.001			<0.004		<0.012			<0.003	
8/10/2011	Total	7.56	137	2	<0.03	1.1	11.5	5.1	9.9	<0.03	0.038	<0.002	0.098	0.021	<0.001	1.95	<0.001	<0.009	0.010	<0.0004	<0.0004	0.002	0.002	<0.006	0.001	<0.004	0.008	<0.012	2.23	0.035	<0.003	<0.003
9/15/2011	Total																															
10/5/2011	Total	7.42	212	7	0.083	0.2	21.8	10.2	16.7	<0.03	0.051	<0.002	0.377	0.923	<0.001	2.37	<0.001	<0.009	0.020	<0.0004	0.0010	0.002	0.002	<0.006	0.003	<0.004	0.023	<0.012	4.00	0.068	0.006	0.0150
11/16/2011	Total	7.71	343	3	0.049	2.5	30.2	16.7	34.8	<0.03	0.043	<0.002	0.421	1.797	<0.001	2.98	0.010	<0.009	0.026	<0.0004	<0.0004	<0.001	0.002	0.050	0.005	<0.004	0.024	<0.012	3.84	0.117	<0.003	0.0046
12/29/2011	Total	7.53	295	3	<0.03	2.1	27.4	15.2	33.2	<0.03	0.047	<0.002	0.108	0.692	<0.001	2.71	<0.001	<0.009	0.015	<0.0004	<0.0004	<0.001	0.002	0.012	0.005	<0.004	0.016	<0.012	4.83	0.109	<0.003	<0.003
1/30/2012	Total	7.45	315	4	<0.03	1.8	32.7	17.6	47.4	0.26	0.059	<0.002	0.779	1.126	0.003	3.05	0.012	<0.009	0.024	<0.0004	0.0004	0.003	0.003	0.015	0.009	<0.004	0.014	<0.012	5.11	0.129	0.007	0.006
3/6/2012	Total	7.91	409	1	<0.03	1.9	44.7	22.4	59.0	<0.03	0.081	<0.002	0.103	1.272	0.004	5.20	0.011	<0.009	0.029	<0.0004	<0.0004	0.002	0.003	0.012	0.009	<0.004	0.022	<0.012	4.37	0.168	<0.003	<0.003
4/19/2012	Total	8.07	428	2	<0.03	1.2	45.4	19.7	62.3	<0.03	0.088	<0.002	0.043	0.582	0.002	4.05	<0.001	<0.009	0.024	<0.0004	0.0008	<0.001	0.002	0.013	0.006	<0.004	0.027	<0.012	4.45	0.146	<0.003	<0.003
5/17/2012	Total	7.27		4	<0.03	1.8	33.0	13.1	39.1	<0.03	0.072	<0.002	0.039	0.135	0.002	3.29	<0.001	<0.009	0.018	<0.0004	<0.0004	<0.001	0.002	0.015	0.003	<0.004	0.010	<0.012	4.25	0.108	<0.003	<0.003
6/13/2012	Total	7.34	416	3	<0.03	1.8	43.8	14.9	54.1	<0.03	0.093	<0.002	0.131	0.305	0.002	3.77	<0.001	0.012	0.023	<0.0004	<0.0004	<0.001	0.002	0.014	0.004	<0.004	0.021	<0.012	4.13	0.124	<0.003	<0.003
7/27/2012	Total	7.14	340	4	<0.03	2.7	80.3	19.2	80.5	<0.03	0.148	<0.002	0.121	0.810	0.004	6.43	0.005	<0.009	0.047	<0.0004	<0.0004	<0.001	0.004	0.030	0.003	<0.004	0.025	<0.012	3.79	0.196	<0.003	<0.003
8/30/2012	Total	7.16	745	7	<0.03	4.5	102.6	22.0	103.8	<0.03	0.204	<0.002	0.373	2.032	0.003	9.23	<0.001	<0.009	0.069	<0.0004	<0.0004	0.0013	0.003	0.044	0.005	<0.004	0.023	<0.012	3.04	0.241	<0.003	<0.003
9/21/2012	No Water/Sampling Stopped																															

SW-02 (Phases I and II East Pond, discontinued) Dissolved

SAMPLING DATE	Type	Field Measurements pH	Cond microS/cm	Redox MV	pH (Lab)	Alkalinity mg/L CaCO3	Acidity meq/L	TDS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ppt	P mg/L	K mg/L	Ca mg/L	Mg mg/L	S mg/L	Al mg/L	B mg/L
Background																			
Sample Size		0	0	0	11	13	13	13	5	13	13	13	13	13	13	13	13	13	13
Average of detected		0.00	0	0.00	7.2	49	0.15	91	2	13.0	46	206	0	1.5	14	6	9	<0.03	0.031
Std.Dev. Of detected		NA	NA	NA	0.4	14	0.16	37	NA	7.6	16	357	0	0.5	2	1	3	NA	0.007
Maximum of Detected		0.00	0	0.00	7.8	71	0.53	129	2	29.3	71	1250	0	2.5	17	7	13	<0.03	0.038
Median of Detected		0.00	0	0.00	7.3	43	0.10	101	2	12.0	42	54	0	1.3	14	6	9	<0.03	0.033
Minimum of Detected		0.00	0	0.00	6.7	31	0.04	0	2	3.1	18	13	0	0.9	8	3	6	<0.03	0.018
% of Detected		#DIV/0!	#DIV/0!	#DIV/0!	100	100	100	92	20	92	100	92	54	100	100	100	100	0	100
DL													<0.03					<0.03	
11/27/2009	Dissolved				6.95	67	0.17	0		3	18	98	0.109	2.5	15.7	6.3	6.0	<0.04	0.038
12/27/2009	Dissolved																		
1/26/2010	Dissolved																		
2/5/2010	Dissolved																		
3/22/2010	Dissolved				6.81	41	0.19	107		5	71	20	0.016	1.7	14.3	5.6	10.4	<0.04	0.025
4/19/2010	Dissolved				6.77	43	0.46	118		4	40	23	0.008	1.1	16.7	6.5	13.3	<0.04	0.023
5/17/2010	Dissolved				6.71	42	0.53	129		12	64	416	<0.004	1.3	16.3	6.5	12.3	<0.04	0.022
6/30/2010	Dissolved																		
7/2/2010	Dissolved																		
8/5/2010	Dissolved				7.04	40	0.10	101		24	30	1250	<0.004	1.7	12.7	5.5	9.3	<0.04	0.031
8/23/2010	Dissolved					44	0.07	101		29	35	19	<0.004	1.3	13.9	6.1	8.1	<0.04	0.038
9/30/2010	Dissolved				7.48	66	0.10	127		11	46	142	0.005	1.3	14.3	5.9	7.2	<0.04	0.036
10/27/2010	Dissolved				7.53	71	0.11	109		14	42	48	0.124	2.4	12.5	5.1	7.1	<0.04	0.036
11/17/2010	Dissolved				7.56	71	0.08	74	<0.10	<0.10	33	14	0.084	1.1	12.5	5.1	7.8	<0.04	0.035
12/15/2010	Dissolved																		
1/25/2011	Dissolved																		
2/22/2011	Dissolved				7.29	31	0.08	42	<0.10	11	41	367	<0.004	1.0	7.6	3.0	5.9	<0.04	0.018
3/29/2011	Dissolved				7.76	49	0.04	92	2.44	16	53	60	<0.03	1.4	15.1	6.2	11.4	<0.03	0.034
5/20/2011	Dissolved				7.29	33	0.04	69	<0.10	11	52	13	<0.03	1.4	12.6	5.4	12.7	<0.03	0.031
7/7/2011	Dissolved				7.66	39	0.04	112	<0.10	15	68	<0.2	0.049	0.9	11.4	5.1	12.1	<0.03	0.033
Reclamation Began																			
Sample Size		2	0	0	24	11	11	11	11		11	11	11	11	11	11	11	11	11
Average of detected		0.0	0	0.00	7.7	56	0.05	275	0.8		138	3	0	2.2	46	18	54	<0.03	0.08
Std.Dev. Of detected		NA	NA	NA	0.2	13	0.01	136	0.8		68	2	0	0.9	26	7	29	NA	0.05
Maximum of Detected		0.0	0	0.00	8.1	85	0.07	547	1.4		280	6	0	4.5	101	33	107	<0.03	0.20
Median of Detected		0.0	0	0.00	7.6	52	0.05	229	0.8		119	3	0	1.9	43	18	54	<0.03	0.07
Minimum of Detected		0.0	0	0.00	7.4	40	0.04	112	0.2		47	1	0	1.1	12	5	10	<0.03	0.04
% of Detected		0	#DIV/0!	#DIV/0!	46	100	100	100	18		100	100	27	100	100	100	100	0	100
DL													<0.03					<0.03	
8/10/2011	Dissolved				7.42	42	0.04	112	<0.10	8	47	1.7	0.044	1.4	11.8	5.3	10.2	<0.03	0.040
9/15/2011	Dissolved																		
10/5/2011	Dissolved				7.81	66	0.05	135	<0.10	12	69	3.4	0.103	2.1	19.4	9.1	16.3	<0.03	0.048
11/16/2011	Dissolved				7.74	65	0.06	152	1.37	12	96	3.2	0.096	2.2	31.8	18.1	40.1	<0.03	0.050
12/29/2011	Dissolved				7.46	52	0.05	201	<0.10	8	92	1.9	<0.03	2.7	58.9	32.7	79.6	<0.03	0.051
1/30/2012	Dissolved				7.62	49	0.06	213	0.17	12	117	5.6	<0.03	1.7	32.5	17.4	47.1	<0.03	0.058
3/6/2012	Dissolved				7.61	51	0.06	364	<0.10	8	168	1.3	<0.03	1.6	43.4	21.8	58.7	<0.03	0.079
4/19/2012	Dissolved				8.11	52	0.04	358	<0.10	8	163	1.3	<0.03	1.1	44.8	19.3	59.8	<0.03	0.087
5/17/2012	Dissolved				7.71	40	0.04	229	<0.10	19	119	5.0	<0.03	1.8	31.7	12.6	37.6	<0.03	0.071
6/13/2012	Dissolved				7.47	49	0.05	294	<0.10	15	139	3.7	<0.03	1.9	44.5	15.2	53.9	<0.03	0.093
7/26/2012	Dissolved				7.80	66	0.07	425	<0.10	27	223	6.2	<0.03	2.7	81.9	19.7	82.1	<0.03	0.149
8/29/2012	Dissolved				7.62	85	0.04	547	<0.10	28	280	3.5	<0.03	4.5	100.6	21.8	106.7	<0.03	0.203
9/21/2012	Dissolved				inaccessible														
10/16/2012	Dissolved				inaccessible														
11/30/2012	Dissolved				inaccessible														
12/19/2012	Dissolved				inaccessible														
1/24/2013	Dissolved				inaccessible														
2/19/2013	Dissolved				inaccessible														
3/14/2013	Dissolved				inaccessible														
5/1/2013	Dissolved				inaccessible														
5/30/2013	Dissolved				inaccessible														
6/26/2013	Dissolved				inaccessible														
8/1/2013	Dissolved				inaccessible														
8/28/2013	Dissolved	inaccessible			inaccessible														
10/4/2013	Dissolved	inaccessible			inaccessible														
9/21/2012	No Water/Sampling Stopped																		

SAMPLING DATE	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Co mg/L	Cr mg/L	Li mg/L	Ni mg/L	Pb mg/L	Sb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	V mg/L
Background																					
Sample Size	15	13	13	18	13	13	13	13	13	13	13	13	15	13	20	13	15	13	13	9	12
Average of detected	<0.002	0.24	0.3	0.0034	2	0.007	<0.009	0.013	<0.0004	0.00046	0.0012	0.0018	0.013	0.002	0.007	0.012	<0.012	1.2	0.0	0.0074	0.003
Std.Dev. Of detected	NA	0.21	0.4	NA	0	0.003	NA	0.004	NA	0.00018	0.0003	0.0006	0.007	0.001	0.003	0.005	NA	0.5	0.0	0.0057	0.002
Maximum of Detected	<0.002	0.76	1.2	0.0034	2	0.011	<0.009	0.020	<0.0004	0.00070	0.0016	0.0028	0.020	0.004	0.009	0.021	<0.012	2.0	0.0	0.0137	0.007
Median of Detected	<0.002	0.20	0.0	0.0034	2	0.006	<0.009	0.013	<0.0004	0.00043	0.0010	0.0019	0.013	0.002	0.007	0.012	<0.012	1.2	0.0	0.0059	0.002
Minimum of Detected	<0.002	0.03	0.0	0.0034	1	0.005	<0.009	0.007	<0.0004	0.00027	0.0009	0.0012	0.006	0.001	0.005	0.006	<0.012	0.4	0.0	0.0026	0.002
% of Detected	0	100	100	6	100	31	0	100	0	31	31	46	27	85	10	100	0	100	100	33	42
DL	<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001	<0.001			<0.004		<0.012			<0.003	<0.003
11/27/2009	<0.002	0.54	0.90	<0.001	2.0	0.011	<0.007	0.020	<0.0005	0.0007	<0.0008	0.001	0.018	<0.001	<0.004	0.017	<0.012	1.32	0.047	<0.007	0.002
12/27/2009				<0.001											<0.004						
1/26/2010				<0.001											<0.004						
2/5/2010				<0.001											<0.004						
3/22/2010	<0.002	0.132	0.31	<0.001	1.5	0.005	<0.007	0.013	<0.0005	<0.0003	0.001	<0.001	<0.017	0.003	<0.004	0.006	<0.012	1.08	0.042		0.002
4/19/2010	<0.002	0.040	0.01	<0.001	1.9	<0.002	<0.007	0.007	<0.0005	<0.0003	0.001	<0.001	<0.017	0.002	<0.004	0.012	<0.012	1.11	0.046	<0.007	<0.0015
5/17/2010	<0.002	0.252	0.04	<0.001	1.8	<0.002	<0.007	0.011	<0.0005	<0.0003	<0.0008	<0.001	<0.017	0.001	<0.004	0.010	<0.012	0.69	0.046	<0.007	<0.0015
6/30/2010													<0.017		<0.004						
7/2/2010													<0.017		<0.004						
8/5/2010	<0.002	0.132	0.01	0.003	1.7	<0.002	<0.007	0.014	<0.0005	0.0003	<0.0008	<0.001	<0.017	0.002	<0.004	0.006	<0.012	0.69	0.038		<0.0015
8/23/2010	<0.002	0.197	0.02	<0.001	1.9	0.006	<0.007	0.014	<0.0005	0.0004	<0.0008	0.003	<0.017	0.003	<0.004	0.009	<0.012	0.94	0.040		0.004
9/30/2010	<0.002	0.320	0.31	<0.001	1.7	<0.002	<0.007	0.017	<0.0005	<0.0003	<0.0008	<0.001	<0.017	0.002	0.005	0.016	<0.012	1.25	0.039	0.014	0.002
10/27/2010	<0.002	0.764	1.23	<0.001	1.9	<0.002	<0.007	0.018	<0.0005	<0.0004	0.002	0.002	0.020	0.004	0.009	0.021	<0.012	1.28	0.035		<0.0015
11/17/2010	<0.002	0.302	0.71	<0.001	1.7	<0.002	<0.007	0.014	<0.0005	0.000	<0.0008	<0.000	<0.017	0.004	<0.004	0.015	<0.012	1.50	0.033	0.003	<0.0015
12/15/2010	<0.002			<0.001											<0.004		<0.012				
1/25/2011	<0.002			<0.001											<0.004		<0.012				
2/22/2011	<0.002	0.102	0.32	<0.001	0.7	<0.002	<0.007	0.007	<0.0005	<0.0004	0.001	<0.000	<0.017	<0.001	<0.004	0.007	<0.012	0.35	0.022	<0.007	0.007
3/29/2011	<0.002	0.033	0.01	<0.001	1.9	0.006	<0.009	0.011	<0.0004	<0.0004	<0.001	0.002	0.007	0.002	<0.004	0.012	<0.012	2.00	0.045	0.006	<0.003
5/20/2011	<0.002	0.081	0.02	<0.001	1.9	<0.002	<0.009	0.012	<0.0004	<0.0004	<0.001	0.001	0.006	0.002	<0.004	0.012	<0.012	1.93	0.037	<0.003	
7/7/2011	<0.002	0.222	0.04	<0.001	1.9	<0.002	<0.009	0.010	<0.0004	<0.0004	<0.001	0.002	<0.006	0.002	<0.004	0.014	<0.012	1.26	0.037	<0.003	<0.003
Reclamation Began																					
Sample Size	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Average of detected	0.004	0.10	0.9	0.0029	4	0.008	0.02	0.026	<0.0004	0.0008	0.0037	0.0024	0.016	0.006	<0.004	0.019	0.045574	3.9	0.1	0.0066	0.006
Std.Dev. Of detected	NA	0.17	0.7	0.0009	2	0.004	NA	0.016	NA	0.0004	0.0029	0.0008	0.011	0.003	NA	0.005	NA	0.7	0.1	NA	0.002
Maximum of Detected	0.004	0.50	2.2	0.0042	9	0.013	0.02	0.065	<0.0004	0.0010	0.0081	0.0040	0.036	0.012	<0.004	0.025	0.045574	4.8	0.3	0.0066	0.009
Median of Detected	0.004	0.02	0.9	0.0030	4	0.006	0.02	0.022	<0.0004	0.0008	0.0025	0.0022	0.012	0.005	<0.004	0.021	0.045574	4.0	0.1	0.0066	0.005
Minimum of Detected	0.004	0.00	0.0	0.0015	2	0.003	0.02	0.010	<0.0004	0.0005	0.0019	0.0012	0.006	0.002	<0.004	0.008	0.045574	2.3	0.0	0.0066	0.005
% of Detected	9	82	100	73	100	45	9	100	0	18	36	100	100	91	0	100	9	100	100	9	27
DL	<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001	<0.001			<0.004		<0.012			<0.003	<0.003
8/10/2011	<0.002	0.215	0.05	<0.001	2.0	<0.001	<0.009	0.010	<0.0004	<0.0004	<0.001	0.001	0.009	0.002	<0.004	0.008	<0.012	2.31	0.036	<0.003	<0.003
9/15/2011																					
10/5/2011	<0.002	0.501	0.91	<0.001	2.3	<0.001	<0.009	0.019	<0.0004	<0.0004	<0.001	0.002	0.008	<0.001	<0.004	0.023	<0.012	3.87	0.059	<0.003	0.005
11/16/2011	<0.002	0.136	1.97	0.002	2.9	<0.001	0.017	0.025	<0.0004	<0.0004	0.002	0.003	0.031	0.005	<0.004	0.017	0.046	4.30	0.123	<0.003	0.009
12/29/2011	<0.002	0.020	0.95	<0.001	4.3	0.006	<0.009	0.015	<0.0004	<0.0004	0.008	0.002	0.012	0.012	<0.004	0.022	<0.012	4.34	0.264	<0.003	<0.003
1/30/2012	<0.002	0.006	1.11	0.003	3.0	0.005	<0.009	0.022	<0.0004	<0.0004	0.003	0.002	0.006	0.008	<0.004	0.018	<0.012	4.83	0.128	<0.003	0.005
3/6/2012	<0.002	0.002	1.25	0.003	4.2	0.011	<0.009	0.028	<0.0004	0.001	0.002	0.003	0.016	0.007	<0.004	0.021	<0.012	4.28	0.157	<0.003	<0.003
4/19/2012	0.003955	0.004	0.51	0.002	4.3	0.013	<0.009	0.021	<0.0004	0.0010	<0.001	0.002	0.008	0.006	<0.004	0.021	<0.012	4.25	0.145	<0.003	<0.003
5/17/2012	<0.002	<0.001	0.06	0.002	3.3	0.003	<0.009	0.016	<0.0004	<0.0004	<0.001	0.002	0.010	0.004	<0.004	0.014	<0.012	3.98	0.103	<0.003	<0.003
6/13/2012	<0.002	<0.001	0.23	0.004	3.8	<0.001	<0.009	0.023	<0.0004	<0.0004	<0.001	0.002	0.012	0.004	<0.004	0.022	<0.012	4.02	0.127	<0.003	<0.003
7/26/2012	<0.002	0.004	0.78	0.003	6.5	<0.001	<0.009	0.046	<0.0004	<0.0004	<0.001	0.003	0.030	0.004	<0.004	0.020	<0.012	3.83	0.200	<0.003	<0.003
8/29/2012	<0.002	0.02	2.22	0.004	9.1	<0.001	<0.009	0.065	<0.0004	<0.0004	<0.001	0.004	0.036	0.004	<0.004	0.025	<0.012	3.08	0.236	0.007	<0.003

SW-03 Total

SAMPLING DATE	pH	Cond microS/cm	Redox mv	Flow Rate ft^3/sec	Temp oC	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TSS mg/L	Hg ppt	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L
	Field Measurements													
Sample Size	53	52	31	38	33	50	50	29	48	50	50	50	50	49
Average of detected	7.30	1689.69	71.67	0.46	15.39	97.31	-38.68	7.31	15.19	36.36	174.15	41.96	0.16	0.957
Std.Dev. Of detected	0.64	683.23	118.58	0.46	6.83	19.27	77.27	9.46	46.38	23.89	48.62	10.47	0.29	0.518
Maximum of Detected	9.30	5170.00	306.90	2.04	28.70	168.07	0.18	40.40	217.00	94.25	320.00	64.00	1.47	2.600
Median of Detected	7.31	1463.00	73.00	0.22	16.83	99.34	0.10	3.80	4.39	29.45	160.50	41.88	0.09	0.780
Minimum of Detected	6.03	1000.00	-84.20	0.16	2.40	41.00	-327.00	1.00	0.00	4.20	101.00	22.51	0.01	0.129
% of Detected	98	100	58	100	100	100	42	90	44	100	100	98	54	100
DL													<0.03	
2/22/2011	7.36	1751				87	0.1		217	42.0	241	31.8	<0.03	0.544
7/7/2011	7.49	1251				107	0.1		4.8	16.5	139	38.4	<0.03	0.372
11/17/2011	7.59	1281				93	0.1		5.6	25.2	168	23.4	<0.03	0.641
3/7/2012	7.60	1051				100	0.1		7.3	14.9	105	34.5	<0.03	0.358
6/14/2012	7.09	1495				94	0.2		4.2	35.8	176	46.2	<0.03	0.575
9/24/2012	6.80	2060				75	0.1		4.2	69.7	211	35.3	<0.03	1.005
12/19/2012	7.32	2270				86	0.1		5.7	70.0	232	25.0	<0.03	1.345
3/14/2013	6.97	1341				97	0.1		2.9	25.7	127	24.7	<0.03	0.602
6/27/2013	7.48	1106				85	0.1		7.1	12.2	152	22.5	1.47	0.530
10/4/2013	7.20	2070		2.04		113	0.1		1.6	61.9	226	41.9	<0.03	1.560
12/29/2013	7.59	1545		1.38		112	0.1		<0.2	38.8	186	29.6	<0.03	1.240
3/31/2014	7.28	1335		1.61	11.90	100	0.2		4.8	29.1	132	28.9	0.18	0.816
7/8/2014	7.50	1324		1.25		96	0.1		4.6	20.5	134	39.8	<0.03	0.524
10/9/2014	7.08	2660		0.31		99	0.2		3.3	87.9	242	36.6	<0.03	1.964
10/29/2014	7.25	2850		0.26		111	0.2		4.1	94.2	257	35.1	<0.03	2.045
4/2/2015	7.61	1117		0.84		124	0.1		2.5	17.9	114	36.1	<0.03	0.370
5/27/2015	7.68	1154		1.07		104	0.1		<0.2	18.8	126	33.9	<0.03	0.451
9/9/2015	7.20	2020		0.40	19.10	102	0.2		<0.2	48.8	178	36.8	<0.03	1.021
1/7/2016	6.76	1458		0.18		97	0.1		<0.2	29.8	142	41.1	<0.03	0.605
3/28/2016	7.31	1439		1.05		101	0.1		<0.2	4.8	112	39.1	<0.03	0.129
6/24/2016														
6/27/2016	7.37	1419	-2.3		21.90	81	<0.04			30.3	159	33.8	0.39	0.712
8/23/2016	7.87	1466	296.9		22.10			1.0	2.0	27.4	163	47.7	0.01	0.661
10/20/2016	7.20	2030		0.29	12.80	168	0.1		3.9	55.1	190	45.9	<0.03	1.140
OSU Sampling Ended.														
12/6/2016	7.93	2248	110.8	0.23		86	<0.008	1.00	4.4	75.6	249	49.9	0.013	1.61
2/21/2017	7.98	1401	-5.2		9.40	113	<0.4	1.00	16.0	29	152	42.4	0.041	0.605
6/14/2017	6.90	1663	306.9	0.22	24.10	114	<5	8.5	< 2	37.9	175	38.7	0.116	0.874
9/13/2017	6.88	1776	-25.8	0.20	20.80	108	<5	7.2	< 90	41.5	183	46.7	0.011	0.936
11/8/2017	7.37	1552	-26.2	0.23	17.10			13.1	< 90	37.5	161	29.0	0.146	1.190
2/7/2018	9.30	1311	-77.7	0.21	2.40	118	< 5	12.5	< 90	31.5	145	37.9	0.144	0.685
5/2/2018	7.20	1180	54.5	0.21	27.50	82.9	< 5	2	< 2	8.90	125	57.7	0.0575	0.364
7/11/2018	7.70	1700	-13.3	0.19	28.70	116	< 5	2	< 2	32.8	179	53.6	0.0236	0.886
10/17/2018	7.60	1420	-84.2	0.18	18.50	127.00	< 8	< 0.3	< 2	25.8	157	51.7	0.026	0.747
2/13/2019	7.70	1000	-78.0	0.32	3.60	61	< 8	40.4	13.0	21.2	101	22.9	0.675	0.577
5/15/2019	7.50	1420	-82.5	0.20	21.60	85.3	< 8		< 2	25.70	141	51.1	0.0306	0.689
8/21/2019	6.60	2320	-55.0	0.19	23.00	76	< 8	2	< 2	84.8	265	53.7	0.1000	1.610
11/20/2019	7.30	2370	-37.9	0.18	8.80	88.10	< 8	2.2	< 2	90.1	266	47.7	0.020	1.330
2/19/2020	7.67	1030	-53.3	0.19	9.30	102	< 8	2.5	< 2	27.3	135	39.0	0.057	0.452
4/29/2020	7.77	1290	-41.8	0.20	20.00	81.0	< 8	3	0.0	20.80	151	55.6	0.0536	0.761
CIP took over sampling														
12/7/2020	6.28	5170	73.0		6.01	41	-5.38	33.0						
3/8/2021	6.82	1070	127		6.58	100	-73.3	<1.0						
4/1/2021	7.03	1460	106	0.20	9.69	91	-62.8	1.0		38.0	160	35.0	0.089	
8/17/2021	9.12	1720	244	0.52	20.24	100	-63.3	11.0	<0.13	46.0	230	45.0	0.099	1.40
11/17/2021	6.99	1660	209	0.22	14.36	87	-16.5	2.0	<0.13	39.0	180	44.0	<0.034	1.20
3/1/2022	7.56	1340	142	0.18	13.46	67	-47.3	9.6	<0.13	13.0	150	48.0	0.180	1.40
4/11/2022	6.85	1690	106	0.66	9.45	77	-61.0	6.7	<0.13	26.0	180	55.0	0.120	1.60
8/10/2022	6.19	3070	244	0.20	19.55	85	<5.0	8.4	<0.13	80.0	320	53.0	0.100	2.600
11/1/2022	6.62	2340	230	0.19	14.51	89	-87.00	3.9	<0.13	52.0	240	55.0	<0.034	1.600
3/16/2023	6.55	1520	149	0.18	6.50	100	-91.20	5.0	<0.13	15.0	140	52.0	0.061	0.780
4/19/2023	6.38	1390	148	0.18	18.54	110	-93.80	5.7	<0.13	23.0	180	50.0	0.048	1.600
9/12/2023	6.03	1440	95	0.49	17.66	110	-297.0	3.7	<0.13	4.2	140	64.0	<0.034	0.700
12/6/2023	8.82	1290	63	0.52	11.94	110	-327.0	2.4	<0.13	4.6	140	52.0	<0.034	0.490
Sampling frequency Changed to Semi-Annual basis per ODNR Approval														
5/16/2024	6.46	1530	100	0.16	16.83	110	-92.30	6.7	<0.13	9.4	150	56.0	0.140	1.000

SAMPLING DATE	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	SiO2 mg/L
Sample Size	50	50	50	50	50	50	50	50	50	50	50	50	50	50	34	50	50	21
Average of detected	0.0010	1.31	1.72	0.023	77.52	0.009	0.005	0.058	0.0001	0.00035	0.0018	0.0119	0.0004	0.0015	4.98	0.665	0.000795	11.98
Std.Dev. Of detected	0.0008	0.63	0.64	0.013	38.93	0.008	0.005	0.033	0.0000	0.00040	0.0020	0.0056	0.0008	0.0025	1.22	0.252	0.001729	2.90
Maximum of Detected	0.0037	4.74	2.90	0.056	210.00	0.047	0.024	0.196	0.0002	0.00180	0.0064	0.0258	0.0030	0.0128	7.61	1.400	0.006900	22.30
Median of Detected	0.0009	1.18	1.78	0.020	71.35	0.007	0.004	0.043	0.0000	0.00018	0.0012	0.0106	0.0002	0.0008	5.21	0.585	0.000154	11.00
Minimum of Detected	0.0004	0.34	0.55	0.002	22.56	0.003	0.001	0.029	0.0000	0.00003	0.0000	0.0004	0.0000	0.0003	1.79	0.352	0.000050	8.43
% of Detected	40	98	100	98	100	72	60	100	32	56	70	98	30	50	100	100	44	100
DL	<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001		<0.004	<0.012			<0.003	
2/22/2011	0.004	1.15	0.73	0.028	45.2	0.006	<0.007	0.131	<0.0005	<0.0004	0.005	0.009	<0.004	<0.012	1.79	0.791	<0.007	
7/7/2011	<0.002	0.34	1.35	0.013	22.6	0.004	<0.009	0.069	<0.0004	<0.0004	0.005	0.010	<0.004	<0.012	2.55	0.436	<0.003	
11/17/2011	<0.002	1.05	0.63	0.025	32.1	0.008	<0.009	0.096	<0.0004	<0.0004	0.006	0.007	<0.004	<0.012	3.07	0.498	<0.003	
3/7/2012	<0.002	1.19	1.72	0.014	26.1	0.019	<0.009	0.050	<0.0004	0.0005	0.004	0.024	<0.004	<0.012	5.26	0.383	<0.003	
6/14/2012	<0.002	1.99	1.85	0.019	38.6	0.006	<0.009	0.088	<0.0004	0.0006	0.004	0.017	<0.004	<0.012	6.54	0.688	0.003	
9/24/2012	<0.002	1.03	2.05	0.038	57.3	0.003	<0.009	0.094	<0.0004	0.0006	0.006	0.014	<0.004	<0.012	5.89	1.012	<0.003	
12/19/2012	<0.002	1.46	0.73	0.044	90.9	0.009	<0.009	0.112	<0.0004	<0.0004	0.005	0.008	<0.004	<0.012	4.23	1.025	<0.003	
3/14/2013	<0.002	1.21	0.65	0.017	48.7	0.009	0.024	0.062	<0.0004	<0.0004	<0.001	0.004	<0.004	0.013	3.36	0.471	<0.003	
6/27/2013	<0.002	4.74	0.55	0.016	30.7	0.017	0.012	0.111	<0.0004	<0.0004	0.002	0.009	<0.004	<0.012	5.68	0.352	<0.003	
10/4/2013	<0.002	0.90	1.21	0.038	98.4	<0.001	<0.009	0.078	<0.0004	<0.0004	0.002	0.004	<0.004	<0.012	5.64	0.975	<0.003	
12/29/2013	<0.002	1.14	0.71	0.031	77.9	0.006	<0.009	0.094	<0.0004	0.0007	0.001	0.006	<0.004	<0.012	3.99	0.654	0.007	
3/31/2014	<0.002	1.66	0.87	0.028	69.6	0.009	<0.009	0.196	<0.0004	0.0006	0.002	0.010	<0.004	<0.012	3.85	0.583	<0.003	
7/8/2014	<0.002	0.89	1.76	0.014	41.5	0.006	<0.009	0.058	<0.0004	<0.0004	0.001	0.017	<0.004	<0.012	5.94	0.519	<0.003	
10/9/2014	<0.002	1.19	2.16	0.055	124.1	0.005	<0.009	0.085	<0.0004	<0.0004	0.002	0.011	<0.004	<0.012	5.35	1.185	<0.003	
10/29/2014	<0.002	1.05	2.05	0.046	145.6	0.006	<0.009	0.094	<0.0004	<0.0004	0.001	0.015	<0.004	<0.012	5.15	1.015	<0.003	
4/2/2015	<0.002	<0.001	1.08	0.012	37.6	<0.001	<0.009	0.048	<0.0004	0.0004	<0.001	0.008	<0.004	<0.012	4.29	0.463	<0.003	
5/27/2015	<0.002	0.74	1.01	0.014	38.3	<0.001	<0.009	0.057	<0.0004	0.0004	0.002	0.008	<0.004	<0.012	4.60	0.479	<0.003	
9/9/2015	<0.002	0.91	1.77	0.026	83.5	0.003	<0.009	0.104	<0.0004	<0.0004	0.002	0.007	<0.004	<0.012	5.15	0.779	<0.003	
1/7/2016	<0.002	1.82	2.16	0.017	56.6	<0.04	<0.001	0.052	<0.0004	0.0012	0.002	<0.015	<0.006	<0.004	5.51	0.571	<0.003	
3/28/2016	<0.002	0.52	2.53	<0.001	26.3	0.016	<0.009	0.032	<0.0004	0.0018	<0.001	0.008	<0.004	<0.012	7.61	0.455	<0.003	
6/24/2016																		
6/27/2016	0.0015	2.51	1.61	0.022	54.4	0.007	0.005	0.043	0.0001	0.0005	0.0006	0.009	0.00082	0.0034		0.604	0.00009	
8/23/2016	0.0004	1.18	2.40	0.015	65.9	0.003	0.002	0.041	0.0001	0.0003	0.0001	0.008	0.00005	0.0004		0.525	0.00010	
10/20/2016	<0.002	0.89	1.85	0.026	95.6	0.004	<0.009	0.055	<0.0004	<0.0004	0.003	0.013	<0.004	<0.012	4.73	0.812	<0.003	
OSU Sampling Ended.																		
12/6/2016	0.00053	0.97	2.03	0.0367	137	0.0058	0.00121	0.0433	0.000210	0.00040	0.000100	0.0106	0.000270	0.0011		1.05	0.000065	
2/21/2017	0.00059	1.04	1.53	0.0203	62.7	0.0066	0.00182	0.0358	0.000027	0.00005	0.000077	0.0106	0.000082	0.0006		0.548	0.000295	
6/14/2017	0.00119	1.33	1.28	0.0225	71.7	0.0036	0.00484	0.0497	0.000050	0.00003	0.000189	0.0089	0.000215	0.0006		0.657	0.000106	
9/13/2017	0.00094	1.21	1.50	0.0155	79.5	0.0030	0.00159	0.0435	0.000010	0.00003	0.000040	0.0004	0.000057	0.0003		0.687	0.000050	
11/8/2017	0.00120	1.36	1.39	0.0243	86.1	0.0057	0.00609	0.0414	0.000053	0.00004	0.000345	0.0071	0.002970	0.0012		0.613	0.000192	
2/7/2018	0.00103	1.76	1.35	0.0166	57.7	0.0087	0.00269	0.0377	0.000046	0.00007	0.000290	0.0099	0.000215	0.0006	3.94	0.573	0.000095	8.43
5/2/2018	0.00046	0.861	1.73	0.00515	32.9	0.0467	0.00158	0.0308	0.000030	0.00010	0.000155	0.0237	0.000036	0.0004		0.375	0.000116	10.9
7/11/2018	0.00060	1.45	1.67	0.0170	73.8	0.0054	0.00398	0.0389	0.000023	0.00006	0.000200	0.0121	0.000042	0.0003		0.642	0.000110	14.1
10/17/2018	0.00084	0.98	1.84	0.0127	57.9	0.0075	0.00226	0.0375	0.000020	0.00005	0.000213	0.0118	0.000030	0.0004		0.587	< 0.0001	12.8
2/13/2019	0.00165	1.67	0.83	0.0152	49.5	0.0116	0.01080	0.0310	0.000110	0.00007	0.001140	0.0112	0.000981	0.001		0.372	0.000200	9.1
5/15/2019	0.00040	1.070	2.27	0.01680	65.1	0.0126	0.00357	0.0298	0.000040	0.00009	0.000200	0.0242	0.00003	0.0004		0.527	0.000100	11.7
8/21/2019	0.00100	1.06	2.65	0.0442	137.0	0.0080	0.00488	0.0572	< 0.0001	0.00007	0.000300	0.0142	< 0.0002	0.0006		1.140	< 0.0005	22.3
11/20/2019	0.00050	1.18	2.36	0.0515	138.0	0.0074	0.00197	0.0457	0.000020	0.00007	0.000200	0.0132	< 0.00005	0.0006		1.180	0.000100	10.6
2/19/2020	0.00040	1.20	1.16	0.0141	53.2	0.0071	0.00338	0.0291	0.000040	0.00006	0.000200	0.0100	< 0.00005	0.0004		0.528	0.000100	8.94
4/29/2020	0.00050	1.030	2.39	0.01270	82.4	0.0150	0.00419	0.0307	0.000040	0.00013	0.000295	0.0258	< 0.00005	0.0008		0.544	0.000200	10.7
CIP took over sampling																		
12/7/2020																		
3/8/2021																		
4/1/2021	<0.0035	0.98	1.10	0.0290	87.0	<0.0097	0.0055	0.035	<0.00060	0.00047	<0.00063	0.0110	<0.0028	<0.0060	3.80	0.660	0.004200	
8/17/2021	<0.0017	1.30	2.40	0.0320	100.0	<0.015	0.004	0.043	<0.00062	<0.00020	<0.0025	0.0097	<0.00045	0.0016	6.00	0.910	0.000260	13
11/17/2021	<0.0017	0.90	1.80	0.0320	100.0	<0.015	<0.0032	0.036	<0.00062	<0.00020	<0.0025	0.0098	<0.00045	0.0014	4.80	0.730	<0.00020	10
3/1/2022	0.0019	1.10	2.10	0.0076	100.0	0.014	0.0023	0.033	<0.00027	<0.00022	<0.0015	0.0220	0.00048	0.0016	5.10	0.430	<0.00047	11
4/11/2022	0.0011	1.50	2.60	0.0240	140.0	0.018	0.0091	0.033	<0.00027	0.00023	<0.0015	0.0250	0.00045	0.0015	4.90	0.590	<0.00047	11
8/10/2022	<0.0017	1.20	2.90	0.0560	210.0	<0.015	0.012	0.056	<0.00062	<0.00020	<0.0025	0.013	<0.00045	0.0023	6.40	1.400	0.00033	14
11/1/2022	<0.0017	1.10	2.80	0.0380	140.0	<0.015	0.002	0.043	<0.00062	<0.00020	<0.0025	0.012	<0.00045	0.0012	5.80	0.910	0.00038	12
3/16/2023	<0.0017	1.80	2.30	0.0120	79.0	<0.015	0.0046	0.031	<0.00062	<0.00020	<0.0025	0.016	<0.00045	:0.00089	5.50	0.490	0.00023	12
4/19/2023	<0.0017	1.70	2.00	0.0240	120.0	<0.015	0.0081	0.033	<0.00062	<0.00020	<0.0025	0.012	<0.00045	0.0014	5.30	0.580	<0.00020	11
9/12/2023	<0.0017	1.80	2.10	0.0026	71.0	<0.015	0.0018	0.035	<0.00062	<0.0020	<0.0025	0.011	<0.00045	:0.00089	6.80	0.390	<0.00020	15
12/6/2023	<0.0017	1.50	1.90	0.0018	59.0	<0.015	0.0013	0.035	<0.00062	<0.00020	<0.0025	0.010	<0.00045	).000089	5.30	0.390	<0.00020	11
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																		
5/16/2024	<0.0017	1.50	2.50	0.0053	78.0	<0.015	0.0018	0.036	<0.00062	<0.00020	<0.0025	0.014	<0.00045	:0.00089	5.50	0.460	<0.00020	12

SW-03 Dissolved

SAMPLING DATE	TDS mg/L	Flouride mg/L	Chloride mg/L	SO4 mg/L	Hg ppt	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	Si02 mg/L
Sample Size	51	49	50	50	48	50	52	52	52	52	52	52	52	50	52	52	52	52	52	52	52	52	52	52	37	50	50	16
Average of detected	1324.1	0.36	179.1	598.1	11.6	36.7	177.1	44.7	0.016	1.312	0.001	0.93	1.84	0.024	98.8	0.008	0.002	0.055	0.00002	0.0002	0.002	0.011	0.0001	0.001	4.78	0.663	0.00063	11.5
Std.Dev. Of detected	898.3	0.28	195.8	359.8	31.7	23.0	61.4	24.8	0.020	2.199	0.001	2.88	1.46	0.014	160.2	0.004	0.004	0.031	0.00002	0.0003	0.002	0.006	0.0002	0.003	1.16	0.241	0.00202	3.8
Maximum of Detected	6200.0	1.27	1400.0	2800.0	146.0	93.1	460.0	200.0	0.090	16.000	0.002	21.00	11.00	0.056	1200.0	0.017	0.021	0.188	0.00006	0.0008	0.006	0.025	0.0005	0.013	6.80	1.300	0.00847	22.3
Median of Detected	1050.0	0.27	123.0	505.5	4.5	30.2	157.8	40.4	0.010	0.788	0.001	0.51	1.72	0.020	71.8	0.007	0.001	0.045	0.00002	0.0001	0.001	0.010	0.0000	0.001	5.10	0.582	0.00011	11.0
Minimum of Detected	680.0	0.14	44.8	297.0	1.0	4.2	106.3	20.2	0.003	0.301	0.000	0.02	0.40	0.002	23.3	0.002	0.001	0.015	0.00001	0.0000	0.000	0.000	0.0000	0.000	1.70	0.354	0.00004	4.0
% of Detected	96	71	98	100	42	100	100	98	37	100	38	98	98	100	100	69	58	100	25	44	65	98	21	46	100	100	34	100
DL					<0.2				<0.03		<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001		<0.004	<0.012			<0.003	
2/22/2011	1349		159	606	146	41.0	231	30.4	<0.03	0.549	<0.002	0.43	0.73	0.030	43.8	0.004	<0.007	0.125	<0.0005	<0.0004	0.006	0.009	<0.004	<0.012	1.70	0.760	<0.007	
7/7/2011	1025	< 0.10	71	457	7.0	17.0	143	39.4	<0.03	0.377	<0.002	0.96	1.38	0.012	23.3	0.004	<0.009	0.072	<0.0004	<0.0004	0.006	0.011	<0.004	<0.012	2.62	0.450	<0.003	
11/17/2011	967	1.3	78	447	3.3	24.0	159	22.6	<0.03	0.684	<0.002	0.15	0.65	0.026	31.5	0.004	<0.009	0.088	<0.0004	<0.0004	0.005	0.006	<0.004	0.013	3.05	0.471	<0.003	
3/7/2012	884	<0.10	71	387	6.6	15.2	106	35.1	<0.03	0.359	<0.002	0.43	1.72	0.012	26.6	0.012	<0.009	0.051	<0.0004	<0.0004	0.005	0.025	<0.004	<0.012	5.20	0.388	<0.003	
6/14/2012	1280	<0.10	113	506	3.4	36.2	178	46.3	<0.03	0.568	<0.002	0.25	1.80	0.020	39.0	0.003	<0.009	0.088	<0.0004	0.000581	0.005	0.016	<0.004	<0.012	6.19	0.693	<0.003	
9/24/2012	1704	<0.10	251	726	3.6	66.9	200	33.3	<0.03	0.983	<0.002	0.65	2.00	0.037	55.0	0.015	<0.009	0.087	<0.0004	0.00044	0.005	0.015	<0.004	<0.012	5.74	0.957	<0.003	
12/19/2013	1529	<0.10	244	675	3.5	71.4	234	24.8	<0.03	1.309	<0.002	0.40	0.70	0.042	91.7	0.002	<0.009	0.110	<0.0004	<0.0004	0.005	0.007	<0.004	<0.012	3.80	1.028	0.008	
3/14/2013	928	<0.10	91	313	2.6	24.6	108	20.7	<0.03	0.565	<0.002	1.07	0.60	0.021	40.9	0.011	0.021	0.052	<0.0004	<0.0004	0.002	0.002	<0.004	<0.012	3.21	0.404	<0.003	
6/27/2013	806	<0.10	45	358	7.0	12.3	150	20.2	<0.03	0.512	<0.002	0.11	0.40	0.018	31.3	<0.001	<0.009	0.100	<0.0004	<0.0004	<0.001	0.003	<0.004	<0.012	3.50	0.354	<0.003	
10/4/2013	1552	<0.10	223	688	1.7	62.2	225	41.8	<0.03	1.557	<0.002	0.34	1.20	0.039	97.9	<0.001	<0.009	0.077	<0.0004	<0.0004	0.003	0.005	<0.004	<0.012	5.57	0.974	<0.003	
12/29/2013	1164	<0.10	121	481	8.5	38.5	182	29.1	<0.03	1.221	<0.002	0.41	0.69	0.031	77.1	0.005	<0.009	0.092	<0.0004	0.0004	0.002	0.006	<0.004	<0.012	3.82	0.647	<0.003	
3/31/2014	886	<0.10	117	392	1.0	28.9	129	28.2	<0.03	0.796	<0.002	0.13	0.72	0.027	69.2	0.002	<0.009	0.188	<0.0004	0.0005	0.002	0.008	<0.004	<0.012	3.45	0.573	<0.003	
7/8/2014	974	<0.10	79	460	5.5	21.1	139	40.4	<0.03	0.521	<0.002	0.02	1.80	0.014	42.0	0.005	<0.009	0.060	<0.0004	<0.0004	0.002	0.016	<0.004	<0.012	5.78	0.537	<0.003	
10/9/2014	1810	<0.10	317	855	1.2	85.9	237	35.8	<0.03	1.975	<0.002	0.79	2.12	0.055	120.8	0.006	<0.009	0.086	<0.0004	<0.0004	0.003	0.011	<0.004	<0.012	5.29	1.149	<0.003	
10/30/2014	1980	<0.10	345	915	2.1	93.1	248	34.6	<0.03	2.041	<0.002	0.72	1.99	0.046	141.5	0.006	<0.009	0.091	<0.0004	<0.0004	0.002	0.013	<0.004	<0.012	5.02	1.022	<0.003	
4/2/2015	719	0.9	66	334	2.9	17.9	115	36.3	<0.03	0.374	<0.002	<0.001	1.08	0.013	37.8	<0.001	<0.009	0.049	<0.0004	<0.0004	<0.001	0.008	<0.004	<0.012	4.34	0.464	<0.003	
5/27/2015	889	1.2	67	371	<0.2	17.1	119	33.4	<0.03	0.409	<0.002	0.02	1.00	0.014	37.3	<0.001	<0.009	0.051	<0.0004	<0.0004	<0.001	0.008	<0.004	<0.012	4.04	0.454	<0.003	
9/9/2015	1360	0.9	199	680	<0.2	47.8	174	36.0	<0.03	0.986	<0.002	0.11	1.71	0.026	81.6	<0.001	<0.009	0.101	<0.0004	<0.0004	<0.001	0.006	<0.004	<0.012	4.89	0.759	<0.003	
1/6/2016	1008	0.2	112	488	<0.2	28.5	135	39.4	<0.03	0.574	<0.002	1.07	2.04	0.016	53.7	<0.041	<0.001	0.049	<0.0004	0.0008	0.002	<0.015	<0.006	<0.004	5.14	0.545	<0.003	
3/28/2016	956	0.7	110	448	<0.2	26.3	125	26.9	<0.03	0.597	<0.002	0.06	0.92	0.020	45.6	0.002	<0.009	0.049	<0.0004	0.0008	<0.001	0.006	<0.004	<0.012	3.69	0.558	<0.003	
6/24/2016																												
6/27/2016	1050	0.3	123	496	6.0	32.4	162	34.6	0.017	0.721	0.0011	0.20	1.59	0.022	60.6	0.006	0.011	0.040	<0.00002	0.00005	0.0002	0.008	0.00003	0.003		0.627	0.0002	
8/23/2016						28.5	169	49.5	0.005	0.684	0.0005	0.41	2.51	0.016	68.4	0.004	0.001	0.044	0.00006	0.00003	0.0001	0.008	0.00002	0.000	6.58	0.547	0.0001	
10/20/2016	929	0.3	95	338	8.1	34.3	141	36.1	<0.03	0.750	<0.002	0.08	1.07	0.016	68.8	0.002	<0.009	0.059	<0.0004	<0.0004	0.0019	0.005	<0.004	<0.012	5.39	0.726	<0.003	
OSU Sampling Ended.																												
12/6/2016	1560	0.3	270	741	< 90	78.4	252	51.3	0.00765	1.570	0.00078	0.769	2.08	0.0558	145.0	0.0097	0.00116	0.0454	0.00002	0.00006	0.000200	0.01140	0.00003	0.0017	5.23	1.06	0.000078	
2/21/2017	972	0.2	118	471	6	29.1	154	43.0	0.00852	0.599	0.00084	0.457	1.53	0.0196	63.2	0.0083	0.00083	0.0352	0.00001	0.00006	0.000186	0.00995	0.00008	0.0005		0.552	0.000146	
6/14/2017	1200	0.2	165	564		38.1	176	38.4	0.01080	0.864	0.00134	0.320	1.26	0.0224	72.5	0.0052	0.00144	0.0485	0.00005	0.00004	0.000070	0.00808	0.00003	0.0005		0.666	0.000101	
9/13/2017	1200	<0.10	181	589	< 90	44.90	199	51	0.00316	1.080	0.00108	0.773	1.59	0.0154	86.3	0.0026	0.00109	0.0425	0.00001	0.00002	0.000050	0.00047	0.00001	0.0002	5.60	0.737	0.000040	
11/8/2017					< 90	36.4	155	27.7	0.00818	1.140	0.00127	0.514	1.30	0.0247	83.8	0.0074	0.00224	0.0385	0.00001	0.00004	0.000201	0.00674	0.00032	0.0009		0.592	0.000175	
2/7/2018	898	0.21	125	402	< 90	31.2	147	38.1	0.00354	0.654	0.00060	0.885	1.39	0.0176	56.8	0.0080	0.00086	0.0386	0.00001	0.00005	0.000101	0.00925	< 0.000004	0.0003		0.583	0.000059	
5/2/2018	786	0.27	75	491	7	9.27	132	62.8	0.0157	0.301	0.00043	0.452	1.80	0.00461	34.2	0.0113	0.00067	0.0294	0.00001	0.00009	0.000127	0.0230	< 0.000004	0.0003		0.399	0.000111	
7/11/2018	1210	0.36	185	633	< 2	32.9	183	57.2	0.00414	0.911	0.00044	0.617	1.72	0.0166	75.6	0.0065	0.00113	0.0374	0.00001	0.00006	0.000127	0.0118	0.000005	0.0003		0.660	0.000103	
10/17/2018	990.0	0.3	123	484		25.6	157	52.3	0.00580	0.700	0.00059	0.518	1.84	0.0126	58.6	0.0073	0.00094	0.0363	< 0.00002	0.00005	0.0002	0.0116	< 0.00002	0.0004		0.589	< 0.0001	
2/13/2019	680	0.21	89	297		43.1	124	27.9	0.0167	4.800	0.00081	0.598	0.850	0.0157	72.6	0.0079	0.00544	0.0285	0.00002	0.00006	0.0002	0.0106	< 0.00002	0.0006		0.425	0.0002	
5/25/2019	1050	0.25	126	505	< 2	25.1	152	50.3	0.012	0.666	0.00041	0.788	2.39	0.0167	65.8	0.0121	0.00109	0.0293	0.00003	0.00009	0.0002	0.0238	< 0.00002	0.0003		0.531	0.0001	
8/21/2019	1720	0.30	291	745	< 2	84.7	266	53.3	0.090	1.600	0.0010	0.599	2.63	0.0424	137.0	0.007	0.00143	0.0552	< 0.0001	0.00007	0.0003	0.014	< 0.0002	0.0005		1.15	< 0.0005	22.300
11/20/2019	1760.0	0.2	313	760	< 2	88.4	265	46.9	< 0.005	1.340	0.0004	0.997	2.29	0.0527	135.0	0.0077	0.00122	0.0463	< 0.00002	0.00007	0.0002	0.0135	< 0.00005	0.0005		1.16	0.0001	10.600
2/19/2020	854	0.20	111	395	< 2	27.7	137	39.3	0.010	0.470	0.00125	0.85	1.16	0.0146	54.1	0.0083	0.00126	0.0295	0.00002	0.00008	0.0002	0.0104	0.00008	0.0004		0.534	< 0.0001	8.940
4/29/2020	1140	0.27	129	565	< 2	20.9	149	54.9	0.010	0.754	0.0004	0.465	2.37	0.0125	83.2	0.0135	0.00116	0.0305	0.00002	0.00012	0.0002	0.0252	< 0.00005	0.0006		0.543	0.0002	
CIP took over sampling																												
12/7/2020	6200	0.20	1400.0	2800	<0.2		460.0	200	0.039	16	<0.002	21.00	11.000		1200.0	0.016	0.001	0.015	<0.001	<0.001	<0.002	0.0150	<0.001	<0.005	3.50			
3/8/2021	760	0.17	89	360	<0.13		110	37.0	<0.034	0.420	<0.0017	0.93	1.60		46.0	<0.015	0.001	0.030	<0.00031	<0.00020	<0.00098	0.0100	<0.00045	<0.00089				8.6
4/1/2021	970	0.27	160	470	<0.13	40.0	150	35.0	<0.034	1.000	<0.0017	0.690	1.30	0.0300	88.0	<0.015	0.0021	0.035	<0.00031	<0.00020	0.0019	0.0092	<0.00045	<0.00089	4.00	0.680	<0.0027	4.0
8/17/2021	1600	0.34	220	760	<0.13	46.0	230	46.0	<0.034	1.400	<0.0017	0.440	2.50	0.0320	100.0	<0.015	0.0012	0.042	<0.00062	<0.00020	<0.0025	0.0094	<0.00045	0.0015	6.10	0.920	0.00024	13.0
11/17/2021	1300	0.27	210	660	<0.13	40.0	180	44.0	<0.034	1.200	<0.0017	0.570	1.80	0.0330	100.0	<0.015	0.0014	0.038	<0.00062	<0.00020	<0.0025	0.010	<0.00045	0.0013	4.90	0.750	<0.00020	10.0
3/1/2022	1100	0.16	130	540	<0.13	14.0	150	51.0	0.022	1.400	0.0019	0.530	2.20	0.0081	100.0	0.015	0.001	0.035	<0.00027	<0.00022	<0.0015	0.022	0.00024	0.0014	4.90	0.460	<0.00047	11.0
4/11/2022	1200	0.25	170	620	<0.13	25.0	170	56.0	0.016	1.600	0.0016	1.000	2.60	0.0230	140.0	0.017	0.0029	0.033	<0.00027	<0.00022	<0.0015	0.024	0.00045	0.001	4.70	0.580	<0.00047	10.0
8/10/2022	4300	0.37	400	1100	<0.13	77.0	310	52.0	<0.034	2.500	0.0022	0.430	2.80	0.0550	210.0	<0.015	0.0025	0.054	<0.00062	<0.00020	<0.0025	0.013	<0.00045	0.002	5.90	1.300	0.00032	13.0
11/1/2022	1600	0.27	280	800	<0.13	50.0	230	54.0	<0.034	1.600	<0.0017	0.079	2.80	0.0370	130.0	0.015	0.0011	0.042	<0.00062	<0.00020	<0.0025	0.012	<0.00045	<0.00089	5.90	0.890	<0.00020	13.0
3/16/2023	970	0.14	120	480	<0.13	15.0	140	52.0	<0.034	0.780	<0.0017	0.130	2.20	0.0120	78.0	<0.015	0.00078	0.030	<0.00062	<0.00020	<0.0025	0.015	<0.00045	<0.00089	5.40	0.490	<0.00020	11.0
4/19/2023	1300	0.24	170	670	<0.13	23.0	170	49.0	<0.034	1.500	<0.0017	0.580	2.00	0.0240	120.0	<0.015	0.0015	0.033	<0.00062	<0.00020	<0.0012	0.012	<0.00045	0.0011	5.10	0.570	<0.00020	11.0
9/12/2023	1000	0.17	110	520	<0.13	4.2	140	63.0	<0.034	0.690	<0.0017	0.470	2.10	0.0026	71.0	<0.015	0.0015	0.036	<0.00062	<0.00020	<0.0012	0.011	<0.00045	<0.00089	6.80	0.380	<0.00020	15.0
12/6/2023	910	0.16	91	430	<0.13	4.6	140	51.0	<0.034	0.470	<0.0017	1.200	1.80	0.0018	59.0	<0.015	<0.00075	0.035	<0.00062	<0.00020	<0.0012	0.010	<0.00045	<0.00089	5.20	0.390	<0.00020	11.0
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																												
5/16/2024	1100	0.25	100	630	<0.13	10.0	170	60.0	<0.034	1.100	<0.0017	0.740	2.70	0.0057	84.0	<0.015	<0.00075	0.039	<0.00062	<0.00020	<0.0012	0.015	<0.00045	<0.00089	5.70	0.460	<0.00020	12.0

SW-04 total	Field Measurements																															
SAMPLING DATE	pH	Cond microS/cm	Redox mv	Flow ft^3/sec	Temp oC	Alkalinity mg/L CaCO3	Acidity mg/L as CaCO3	TSS mg/L	Hg ppt	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	SiO2 mg/L
Sample Size	52	51	30	46	31	50	50	28	48	50	50	50	50	49	50	50	50	50	50	50	50	50	50	50	50	50	50	50	43	50	50	21
Average of detected	4.81	1990.82	232.90	0.22	15.32	10.53	-1.24	4.73	14.61	12.54	162.26	52.31	0.28	2.240	0.0008	2.27	3.31	0.002	160.04	0.014	0.001	0.029	0.0002	0.0003	0.0017	0.0111	0.0007	0.001	7.52	0.578	0.001	16.58
Std.Dev. Of detected	1.27	1249.82	135.32	0.25	6.88	8.70	67.76	7.94	51.36	9.80	64.77	18.37	0.16	3.073	0.0004	2.52	1.53	0.005	207.54	0.007	0.003	0.019	0.0002	0.0004	0.0018	0.0047	0.0011	0.001	1.61	0.224	0.001	2.99
Maximum of Detected	9.66	5330.00	461.00	1.02	28.40	29.00	57.20	39.00	275.00	37.00	330.00	104.00	0.61	11.000	0.0015	11.50	6.80	0.019	760.00	0.041	0.014	0.136	0.0008	0.0017	0.0059	0.0260	0.0049	0.004	10.90	1.100	0.005	23.20
Median of Detected	4.36	1567.00	220.00	0.09	16.03	8.63	0.75	3.15	4.00	7.66	161.50	48.65	0.23	0.352	0.0006	1.47	3.16	0.001	42.55	0.014	0.000	0.022	0.0002	0.0001	0.0016	0.0109	0.0005	0.001	7.70	0.548	0.000	17.00
Minimum of Detected	3.27	443.00	-41.40	0.01	1.60	3.10	-363.00	0.30	0.35	2.52	67.36	25.64	0.04	0.075	0.0003	0.13	0.64	0.000	5.37	0.004	0.000	0.013	0.0000	0.0000	0.0001	0.0001	0.0001	0.000	3.47	0.255	0.000	11.30
% of Detected	98	100	97	98	100	14	90	79	58	100	100	100	74	100	32	98	100	32	100	86	44	100	40	52	74	98	38	36	100	100	40	100
DL									<0.2				<0.03		<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004	<0.0004	<0.001		<0.004	<0.012			<0.003	
2/22/2011	4.27	947				ND	0.67		275	4.38	100	37	<0.03	0.075	<0.002	1.47	2.64	<0.001	8.42	0.016	<0.007	0.050	<0.0005	<0.0004	0.005	0.015	<0.004	<0.012	3.54	0.390	<0.007	
7/7/2011	4.59	817				ND	0.19		16	2.98	80	34	<0.03	0.087	<0.002	0.75	1.71	<0.001	6.89	0.009	<0.009	0.033	<0.0004	<0.0004	0.006	0.009	<0.004	<0.012	3.47	0.309	<0.003	
11/17/2011	4.28	866		0.04		ND	0.37		0.9	4.79	94	34	<0.03	0.089	<0.002	0.83	2.18	0.002	7.95	0.014	<0.009	0.042	<0.0004	<0.0004	0.004	0.013	<0.004	<0.012	7.29	0.362	<0.003	
3/7/2012	4.08	813		0.04		ND	0.29		8.2	2.52	78	29	<0.03	0.100	<0.002	0.66	2.00	<0.001	6.74	0.029	<0.009	0.028	<0.0004	<0.0004	0.005	0.014	<0.004	<0.012	7.67	0.297	<0.003	
6/14/2012	4.99	784		0.08		12.28	0.15		0.8	3.40	85	38	<0.03	0.105	<0.002	1.70	1.22	<0.001	7.26	0.004	<0.009	0.036	<0.0004	<0.0004	0.003	0.009	<0.004	<0.012	7.71	0.320	<0.003	
9/24/2012	4.20	771		0.22		ND	0.18		4.7	4.23	81	32	<0.03	0.108	<0.002	2.50	1.56	0.002	7.29	0.008	<0.009	0.032	<0.0004	0.000412	0.003	0.011	0.005	<0.012	8.25	0.335	<0.003	
12/19/2012	3.87	929		0.26		ND	0.36		1.2	4.56	84	31	<0.03	0.092	<0.002	0.47	1.79	<0.001	7.72	0.014	<0.009	0.036	<0.0004	<0.0004	0.005	0.014	<0.004	<0.012	7.33	0.319	0.005	
3/14/2013	4.36	831		0.91		ND	0.40		1.4	3.54	67	26	0.13	0.086	<0.002	0.54	1.28	<0.001	5.37	0.015	0.014	0.029	<0.0004	0.000455	0.003	0.005	<0.004	<0.012	6.31	0.255	<0.003	
6/27/2013	5.67	443		0.64		8.63	0.25		5.5	4.33	95	41	0.15	0.125	<0.002	3.58	1.43	0.002	7.49	0.007	<0.009	0.049	<0.0004	<0.0004	<0.001	0.007	<0.004	<0.012	6.93	0.326	<0.003	
10/4/2013	3.88	1055		0.27		ND	0.49		1.3	5.70	111	42	<0.03	0.186	<0.002	1.78	2.12	<0.001	11.2	0.008	<0.009	0.031	<0.0004	0.0005	0.002	0.009	<0.004	<0.012	8.85	0.421	<0.003	
12/29/2013	3.60	849		0.15		ND	0.52		1.8	4.90	99	37	0.04	0.124	<0.002	0.55	2.02	<0.001	9.80	0.012	<0.009	0.041	<0.0004	0.0005	0.003	0.009	<0.004	<0.012	7.32	0.372	<0.003	
3/31/2014	4.14	999		0.34	12.00	ND	0.83		<0.2	4.81	108	37	0.09	0.137	<0.002	0.49	2.39	<0.001	10.4	0.014	<0.009	0.136	<0.0004	<0.0004	0.003	0.010	<0.004	<0.012	7.78	0.433	<0.003	
7/8/2014	4.36	913		0.53		ND	0.59		4.4	4.29	93	35	<0.03	0.138	<0.002	0.72	1.36	<0.001	11.4	0.005	<0.009	0.030	<0.0004	<0.0004	0.002	0.006	<0.004	<0.012	6.64	0.349	<0.003	
10/7/2014	3.27	996		0.27		ND	0.74		0.4	5.02	94	34	<0.03	0.142	<0.002	0.93	2.26	<0.001	12.1	0.012	<0.009	0.028	<0.0004	<0.0004	0.002	0.006	<0.004	<0.012	8.13	0.366	<0.003	
10/30/2014	3.69	1003		0.22		ND	0.69		2.4	4.65	97	36	<0.03	0.125	<0.002	0.85	2.13	<0.001	11.2	0.005	<0.009	0.045	<0.0004	<0.0004	0.002	0.005	<0.004	<0.012	7.99	0.412	<0.003	
4/2/2015	3.95	1154		0.78		ND	0.62		4.4	5.87	124	44	0.11	0.127	<0.002	0.13	2.61	0.002	20.2	0.014	<0.009	0.037	<0.0004	<0.0004	0.002	0.009	<0.004	<0.012	8.20	0.492	<0.003	
5/27/2015	3.84	1155		1.02		ND	0.63		<0.2	5.47	114	44	0.05	0.156	<0.002	0.62	2.31	0.002	24.2	0.009	<0.009	0.036	<0.0004	<0.0004	0.002	0.008	<0.004	<0.012	7.95	0.439	<0.003	
9/9/2015	3.75	1232		0.59		ND	0.75		<0.2	6.31	106	39	<0.03	0.133	<0.002	1.35	2.31	<0.001	21.8	0.009	<0.009	0.053	<0.0004	<0.0004	0.002	0.005	<0.004	<0.012	7.11	0.396	<0.003	
1/7/2016	3.75	1266		0.46		ND	0.70		<0.2	6.06	123	43	0.06	0.129	<0.002	0.79	2.58	0.002	26.6	<0.04	<0.001	0.032	<0.0004	0.0008	0.003	<0.015	<0.004	<0.004	7.93	0.494	<0.003	
3/28/2016	3.60	1368		0.57		ND	0.58		<0.2	27.43	126	26	<0.03	0.639	<0.002	<0.001	0.64	0.019	46.9	<0.001	<0.009	0.047	<0.0004	0.0017	0.001	0.006	<0.004	<0.012	3.61	0.557	<0.003	
6/24/2016																																
6/27/2016	3.67	1264	369.7		23.60	<2	0.47			5.98	132	53	0.18	0.128	0.0014	0.96	3.31	<0.0001	21.7	0.010	0.0004	0.021	0.00012	0.00003	0.0001	0.008	0.0005	0.0003		0.432	0.000102	
8/23/2016	4.29	1259	279.8	0.11	19.60	<0.4	0.71		2.0	6.12	131	49	0.21	0.147	0.00072	1.27	2.59	0.00004	25.9	0.010	0.00031	0.021	0.00015	0.00003	0.0001	0.007	0.0010	0.0005		0.436	0.000244	
10/22/2016	3.50	1419		NA	13.20	ND	2.86		0.4	7.52	144	59	0.07	0.191	<0.002	1.31	2.93	<0.001	30.6	0.013	<0.009	0.027	<0.0004	0.0012	0.004	0.009	<0.004	<0.012	10.90	0.500	<0.003	
OSU Sampling Ended.																																
12/6/2016	5.14	1567	461	0.12		<0.4	0.77	0.4	6.9	6.17	178	69.8	0.134	0.236	0.00025	3.40	3.29	0.00050	39.0	0.0087	0.00033	0.0176	#####	0.00002	0.000100	0.0058	0.000401	0.0003		0.576	0.000459	
2/21/2017	5.43	1590	389.7		9.10	<1	31.70	0.3	29.0	8.21	202	55.2	0.467	0.398	0.00118	1.64	3.76	0.00007	41.3	0.0205	0.00042	0.0214	#####	0.00014	0.000098	0.0148	0.000530	0.0008		0.622	0.000216	
6/14/2017	4.10	1563	456.3	0.09	24.60	<1	40.80	6	< 2	6.94	160	48.4	0.294	0.305	0.00102	1.47	3.09	<0.00002	39.0	0.0148	0.00043	0.0213	#####	0.00005	0.000164	0.0109	0.000888	0.0006		0.513	0.000151	
9/13/2017	4.03	1693	415	0.08	21.70	<1	46.80	0.7	< 90	7.80	183	66.3	0.475	0.431	0.00043	1.84	4.05	<0.00002	53.7	0.0157	0.00044	0.0204	#####	0.00005	0.000123	0.0001	0.000775	0.0009		0.603	0.000125	
11/8/2017	3.86	1476	365.2	0.09	16.70			0.9	< 90	6.97	146	52.1	0.447	0.352	0.00066	2.35	3.26	0.00003	43.8	0.0190	0.00040	0.0212	#####	0.00010	0.000146	0.0124	0.000779	0.0010		0.497	0.000150	
2/7/2018	5.70	2056	234.5	0.08	1.60	< 1	57.2	6.0	< 90	9.13	217	70.7	0.537	1.12	0.00149	11.5	4.24	0.00016	94.1	0.0188	0.00064	0.0183	#####	0.00012	0.000217	0.0136	0.000938	0.0016	9.06	0.715	0.000230	19.4
5/2/2018	3.80	1820	409.2	0.08	27.60	< 1	28.9	2.0	5	8.48	188	60.5	0.231	1.16	0.00048	2.74	3.22	0.00006	103	0.0131	0.00037	0.0174	#####	0.00007	0.000154	0.00998	0.000425	0.0009	9.99	0.608	0.000200	21.4
7/11/2018	3.90	2450	393.8	0.07	28.40	< 1	33.9	0.3	3	9.90	211	82.0	0.190	1.91	0.00040	1.70	4.23	0.00005	151	0.0119	0.00035	0.0200	#####	0.00005	0.000173	0.0108	0.000404	0.0006	10.83	0.650	0.000174	23.2
10/17/2018	4.60	2870	333.3	0.07	17.90	< 3	38.90	0.5	4	12.30	234	85.5	0.273	2.700	0.00123	7.44	4.64	< 0.0008	213	0.0139	0.00045	0.0184	0.0002	0.00007	0.0002	0.012	0.000225	0.0009	9.29	0.737	< 0.0002	19.9
2/13/2019	6.10	2004	134.9	0.12	4.00	< 3	20.00	6.6	11	10.20	163	50	0.308	2.680	0.00046	2.59	2.92	< 0.0004	176	0.0116	0.00032	0.0209	#####	0.00009	0.000250	0.00872	0.000280	0.0006	8.73	0.538	0.0002	18.7
5/15/2019	5.90	2290	146.5	0.07	22.20	< 3	10.00	< 0.3	5	12.70	170	58.3	0.197	3.100	0.00025	1.81	3.41	< 0.0004	206	0.0112	0.00024	0.0171	#####	0.00007	0.0001	0.0102	0.00008	0.0006	7.38	0.571	0.0002	15.8
8/21/2019	4.00	3260	154.1	0.06	22.70	< 5	20	< 0.2	4	20.60	252	85.7	0.231	5.380	< 0.001	3.25	4.96	< 0.002	349	0.010	0.0004	0.0203	0.0002	< 0.00005	0.0002	0.0127	< 0.0002	0.001	5.28	0.787	< 0.0005	11.3
11/20/2019	4.50	3660	120.8	0.06	9.00	< 5	36.50	< 0.4	4	22.60	260	104	0.610	5.690	0.00139	8.47	6.32	0.0007	412	0.0262	0.00056	0.0156	#####	0.00016	0.0002	0.022	0.0001	0.0019	8.08	0.831	0.0002	17.3
2/19/2020	6.11	2070	69	0.07	8.40	< 5	20.00	< 0.3	4	14.80	183	61	0.300	3.270	0.0004	2.91	4.23	< 0.0004	247	0.0154	0.00027	0.0185	#####	0.00013	0.0002	0.0133	0.00006	0.0008	7.42	0.632	0.0001	15.9
4/29/2020	7.67	1900	-41	0.08	19.70	6.00	9.00	3.3	2	13.20	179	49	0.171	3.060	0.0003	1.50	3.32	< 0.0004	235	0.010	0.00029	0.018	#####	0.0001	0.0002	0.00982	0.00008	0.0006	7.61	0.602	0.0002	16.3
CIP took over sampling																																
9/23/2020																																
11/25/2020																																
3/8/2021	4.61	5330	210		12.97	<2.6	53.00	4.0																								
4/1/2021	5.73	2780	171	0.06	5.76	<2.6	37.00	3.0		17.00	220	63	0.570		<0.0035	0.910	5.10	<0.0049	300.00	0.041	0.0047	0.028	0.00079	0.00094	<0.00063	0.026	<0.0028	<0.0060	9.50	0.790	0.003	
8/17/2021	9.66	2370	230	0.13	19.24	29.00	-12.00	39.0	<0.13	25.00	330	48	0.280	3.10	<0.0017	11.000	3.00	0.0051	210.00	<0.015	0.0013	0.031	<0.00062	<0.00020	<0.0025	0.011	<0.00045	0.004	6.60	1.100	0.00052	14
11/17/2021	4.74	3690	280	0.08	14.80	<2.6	28.00	7.0	<0.13	26.0	240	86	0.300	7.30	<0.0017	2.7	6.50	<0.0011	500.00	0.019	<0.00075	0.015	<0.00062	<0.00020	<0.0025	0.012	<0.00045	<0.00089	8.60	0.94	<0.00020	18
3/1/2022	5.68	1860	179	0.06	12.01	<5.0	49.00	2.0	<0.13	23.0	180	42	0.490	3.40	<0.0011	0.71	3.40	<0.00061	170.00	0.027	0.00036	0.038	0.00028	0.00052	<0.0015	0.019	0.00047	<0.00074	7.70	0.64	<0.00047	17
4/11/2022	4.62	2190	174	0.23	9.78	<2.6	24.00	3.4	<0.13	22.0	210	45	0.520	3.40	<0.0011	0.49	3.50	<0.00061	200.00	0.028	0.00050	0.023	0.00028	0.00041	<0.0015	0.020	<0.00017	<0.00074	6.20	0.64	<0.00047	13
8/10/2022	3.93	3230	308	0.08	18.79	<2.6	23.00	4.9	<0.13	25.0	200	57	0.550	5.10	<0.0017	3.5	5.00	<0.0011	370.00	0.018	<0.00075	0.021	<0.00062	<0.00020	<0.0025	0.015	0.00080	<0.00089	8.60	0.77	0.00020	18
11/1/2022	4.97	4630	263	0.05	15.17	<2.6	23.00	2.2	<0.13	33.0	260	84	0.360	8.70	<0.0017	0.48	6.80	<0.0011	670.00	<0.015	<0.00075	0.016	<0.00062	<0.00020	<0.0025	0.013	<0.00045	<0.00089	7.80	1.0	<0.00020	17
3/16/2023	6.44	4660	192	0.01	6.33	<2.6	33.00	1.2	<0.13	30.0	240	71	0.390	9.00	<0.0017	0.9	5.80	<0.0011	610.00	<0.015	<0.00075	0.013	<0.00062	<0.00020	<0.0025	0.015	<0.00045	<0.00089	6.50	1.0	0.00022	14
4/19/2023	6.98	3370	107	0.04	16.11	<2.6	-129.00	2.6	<0.13	27.0	210	52	0.270	8.20	<0.0017	0.65	4.80	<0.0011	430.00	0.016	<0.00075	0.014	<0.00062	<0.00020	<0.0025	0.014	<0.00045	<0.00089	7.00	0.8	<0.00020	15
9/12/2023	5.70	4570	48	0.08	17.26	5.10	-228.00	5.0	<0.13	34.0	260	67	0.180	10.0	<0.0017	6.0	5.60	<0.0011	740.00	<0.015	<0.00075	0.015	<0.00062	<0.00020	<0.0025	0.012	<0.00045	<0.00089	7.80	1.0	<0.00020	17
12/6/2023	7.30	4980	95	0.19	8.76	3.10	-363.00	<0.40	<0.13	37.0	280	78	0.130	11.0	<0.0017	3.0	6.60	<0.0011	760.00	<0.015	<0.00075	0.014	<0.00062	<0.00020	<0.0025	0.014	<0.00045	<0.00089	6.10	1.1	<0.00020	13
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																
5/16/2024	6.48	2470	39	0.07	16.03	9.60	-8.36	3.5	<0.13	23.0	190	41	0.190	5.4	<0.0017	1.9	3.30	<0.0011	290.00	0.017	<0.00075	0.020	<0.00062	<0.00020	<0.0025	0.015	<0.00045	<0.00089	6.30	0.64	<0.00020	13

SW-04 dissolved SAMPLING DATE	TDS mg/L	Flouride mg/L	Chloride mg/L	SO4 mg/L	Hg ppt	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	Si02 mg/L
Sample Size	51	49	50	50	47	50	51	51	51	51	51	51	51	49	51	51	51	51	51	51	51	51	51	51	36	50	50	16
Average of detected	1480	0.30	220.0	794	28.7	12.20	161.8	52.3	0.260	2.356	0.001	1.85	3.36	0.001	166.08	0.017	0.0004	0.0274	0.00020	0.00026	0.0017	0.0112	0.0005	0.0010	7.49	0.571	0.0007	15
Std.Dev. Of detected	930	0.28	231.8	420	112.5	9.66	68.5	20.3	0.160	3.201	0.001	2.43	1.63	0.001	217.97	0.010	0.0001	0.0175	0.00018	0.00035	0.0017	0.0045	0.0003	0.0007	1.69	0.234	0.0014	3
Maximum of Detected	4200	1.22	950.0	1900	532.0	37.00	330.0	110.0	0.617	11.000	0.004	11.00	7.70	0.004	760.00	0.051	0.0009	0.1270	0.00086	0.00170	0.0051	0.0230	0.0010	0.0034	11.39	1.200	0.0056	21
Median of Detected	1135	0.19	107.5	710	3.3	7.64	165.0	47.7	0.258	0.352	0.001	0.88	3.18	0.002	41.10	0.016	0.0004	0.0227	0.00016	0.00014	0.0011	0.0109	0.0005	0.0008	7.54	0.509	0.0002	15
Minimum of Detected	625	0.06	5.5	320	1.4	2.63	59.9	23.0	0.032	0.071	0.000	0.15	0.83	0.000	4.81	0.004	0.0002	0.0028	0.00002	0.00005	0.0001	0.0001	0.0001	0.0003	3.50	0.230	0.0001	11
% of Detected	94	73	100	100	47	100	100	98	69	100	41	100	100	37	100	92	37	100	35	47	71	98	39	35	100	100	36	100
DL		<0.1			<0.2				<0.03		<0.002			<0.001	<0.001		<0.009		<0.0004	<0.0004	<0.001		<0.004	<0.012	<0.012			
2/22/2011	672		14.4	428	532	4.25	97.5	36.1	<0.03	0.071	0.002	1.44	2.63	<0.001	8.15	0.021	<0.007	0.048	<0.0005	<0.0004	0.005	0.015	<0.004	<0.012	3.50	0.380	<0.007	
7/7/2011	625	< 0.10	16.1	404	15.3	3.19	81.5	34.2	<0.03	0.088	<0.002	1.19	1.69	0.003	7.02	0.007	<0.009	0.032	<0.0004	<0.0004	0.005	0.010	<0.004	<0.012	3.50	0.306	<0.003	
11/17/2011	632	1.2	13.2	392	2.9	4.69	94.5	34.6	<0.03	0.091	<0.002	0.85	2.23	<0.001	7.99	0.012	<0.009	0.042	<0.0004	<0.0004	0.005	0.011	<0.004	<0.012	7.46	0.366	0.003	
3/7/2012	729	<0.10	6.9	433	3.3	2.63	81.2	30.6	<0.03	0.101	<0.002	0.55	2.13	<0.001	6.80	0.014	<0.009	0.032	<0.0004	<0.0004	0.005	0.014	<0.004	<0.012	8.15	0.315	<0.003	
6/14/2012	686	<0.10	15.8	388	2.0	3.29	84.8	37.5	<0.03	0.103	<0.002	0.54	1.22	<0.001	7.19	0.005	<0.009	0.035	<0.0004	<0.0004	0.004	0.011	<0.004	<0.012	7.58	0.321	<0.003	
9/24/2012	633	<0.10	19.3	392	5.9	4.16	76.8	30.4	<0.03	0.104	<0.002	1.19	1.45	0.002	7.18	0.015	<0.009	0.030	<0.0004	0.0004	0.003	0.011	<0.004	<0.012	7.74	0.314	<0.003	
12/18/2012	659	<0.10	7.9	413	3.1	4.40	88.9	33.0	<0.03	0.092	<0.002	0.46	1.84	<0.001	7.80	0.012	<0.009	0.039	<0.0004	<0.0004	0.004	0.012	<0.004	<0.012	7.50	0.337	0.006	
3/14/2013	635	<0.10	5.5	320	1.4	2.98	59.9	23.0	<0.03	0.080	<0.002	0.35	1.22	0.003	4.81	0.015	<0.009	0.026	<0.0004	<0.0004	<0.001	0.005	<0.004	<0.012	6.03	0.230	<0.003	
6/27/2013	673	<0.10	12.0	381	6.2	4.11	92.1	40.4	<0.03	0.112	<0.002	0.66	1.30	0.003	7.32	0.005	<0.009	0.044	<0.0004	<0.0004	<0.001	0.006	<0.004	<0.012	6.43	0.318	<0.003	
10/4/2013	787	<0.10	15.6	497	1.5	5.74	111	42.3	<0.03	0.175	<0.002	0.58	2.09	0.002	11.2	0.008	<0.009	0.030	<0.0004	0.0006	0.004	0.009	<0.004	<0.012	8.67	0.420	<0.003	
12/29/2013	693	<0.10	54.0	381	1.6	4.88	97.7	36.6	0.042	0.125	<0.002	0.46	1.99	<0.001	9.90	0.024	<0.009	0.046	<0.0004	<0.0004	0.002	0.008	<0.004	<0.012	7.14	0.370	<0.003	
3/31/2014	697	<0.10	14.0	463	<0.2	4.00	98.1	33.6	0.077	0.138	<0.002	0.31	2.20	<0.001	9.17	0.024	<0.009	0.127	<0.0004	<0.0004	0.002	0.010	<0.004	<0.012	7.95	0.398	<0.003	
7/8/2014	687	<0.10	20.7	421	2.5	4.35	92.0	35.3	<0.03	0.140	<0.002	0.50	1.33	<0.001	11.4	0.006	<0.009	0.031	<0.0004	<0.0004	0.001	0.006	<0.004	<0.012	6.69	0.351	<0.003	
10/9/2014	698	<0.10	48.4	452	<0.2	4.75	91.1	32.9	<0.03	0.135	<0.002	0.83	2.23	<0.001	11.6	0.011	<0.009	0.029	<0.0004	<0.0004	0.003	0.007	<0.004	<0.012	8.05	0.355	<0.003	
10/30/2014	678	<0.10	36.5	412	<0.2	4.61	92.5	33.1	<0.03	0.115	<0.002	0.79	1.98	<0.001	11.0	0.004	<0.009	0.041	<0.0004	<0.0004	0.003	0.006	<0.004	<0.012	7.88	0.415	<0.003	
4/2/2015	774	0.93	45.2	476	3.4	5.67	122	43.3	0.098	0.132	<0.002	0.17	2.67	<0.001	19.9	0.014	<0.009	0.036	<0.0004	<0.0004	0.001	0.009	<0.004	<0.012	8.37	0.485	<0.003	
5/27/2015	845	1.12	55.5	473	<0.2	4.83	102	39.2	0.056	0.138	<0.002	0.34	2.11	0.002	21.5	0.009	<0.009	0.032	<0.0004	<0.0004	0.002	0.007	<0.004	<0.012	6.98	0.396	<0.003	
9/19/2015	813	0.73	59.1	513	<0.2	5.58	101	37.1	<0.03	0.124	<0.002	0.87	2.23	<0.001	20.7	0.007	<0.009	0.049	<0.0004	0.0004	0.002	0.005	<0.004	<0.012	6.79	0.376	<0.003	
1/7/2016	864	0.17	61.4	537	<0.2	6.01	118	41.6	0.114	0.121	<0.002	0.74	2.50	0.001	25.6	<0.04	<0.009	0.029	<0.0004	<0.0004	0.003	<0.015	<0.004	<0.004	7.60	0.475	<0.003	
3/28/2016	955	0.62	67.8	548	<0.2	4.95	106	36.7	<0.03	0.126	<0.002	0.31	2.35	0.002	25.0	0.016	<0.009	0.029	<0.0004	0.0017	<0.001	0.011	<0.004	<0.012	7.16	0.431	<0.003	
6/24/2016																												
6/27/2016	960	0.10	69.1	580	<5	6.56	139	54.4	0.177	0.132	0.0007	0.62	3.34	<0.0001	24.8	0.017	0.0004	0.021	0.00013	0.00005	0.00010	0.008	0.0005	0.0003		0.454	0.00009	
8/23/2016	862	0.16	59.1	572		6.81	144	53.5	0.202	0.160	0.00105	1.30	2.84	0.00006	28.6	0.017	0.0003	0.020	0.00015	0.00005	0.00010	0.007	0.0009	0.0004	11.4	0.484	0.00022	
10/22/2016	926	0.49	61.7	685	2.6	6.76	134	55.5	0.071	0.174	<0.002	1.31	2.78	0.00150	28.2	0.015	<0.009	0.025	<0.0004	<0.0004	0.00320	0.006	<0.004	<0.012	10.2	0.467	<0.003	
OSU Sampling Ended.																												
12/6/2016	1100	0.10	90.2	700	< 90	7.95	177	69.7	0.136	0.311	0.0010	3.29	3.24	0.00178	39.7	0.0229	0.00036	0.0198	0.000104	0.00006	0.000100	0.0059	0.000430	0.0004	10.6	0.582	0.000237	
2/28/2017	1170	0.18	105.0	742	15.00	8.05	199	53.8	0.449	0.376	0.0017	1.55	3.72	0.00017	40.4	0.0282	0.00042	0.0227	0.000266	0.00016	0.000206	0.0149	0.000529	0.0008		0.609	0.000209	
6/14/2017	1090	0.10	110.0	754		7.46	170	50.5	0.287	0.311	0.0039	0.89	3.22	0.00010	41.1	0.0506	0.00037	0.0231	0.000023	0.00014	0.000141	0.0111	0.000849	0.0007		0.547	0.000149	
9/13/2017	1200	0.16	131	720	< 90	7.81	185	67	0.49	0.410	0.0004	1.830	4.03	<0.00002	54.7	0.0181	0.00047	0.0211	0.000189	0.00005	0.000141	0.0001	0.000804	0.0009	10.45	0.61	0.000123	
11/8/2017					< 90	7.18	146	51.8	0.443	0.352	0.0010	2.31	3.23	0.00009	44.0	0.0229	0.00042	0.0214	0.000226	0.00010	0.000214	0.0122	0.000629	0.0010		0.500	0.000139	
2/7/2018	1480	0.19	245	814	< 90	8.36	207	66.5	0.497	1.07	0.0016	10.1	4.06	0.00009	86.1	0.0198	0.00058	0.0174	0.000211	0.00016	0.000177	0.0140	0.000809	0.0018		0.683	0.000223	
5/2/2018	1220	0.20	206	767	7	8.08	180	60.2	0.215	1.02	0.00055	2.13	3.08	0.00005	97.8	0.0139	0.00034	0.0172	0.000150	0.00008	0.000180	0.00982	0.000397	0.0008		0.581	0.000181	
7/11/2018	1740	0.24	335	923	3	9.85	215	86.5	0.185	1.95	0.00047	1.71	4.26	0.00008	152	0.0136	0.00034	0.0190	0.000136	0.00006	0.000206	0.0105	0.000395	0.0006		0.658	0.000203	
10/17/2018	2030	0.28	420.0	1030		11.9	234	85.0	0.258	2.740	0.00129	7.41	4.67	< 0.0008	212	0.0147	0.00044	0.0182	0.0002	0.00007	0.0003	0.0119	0.000216	0.0011		0.738	< 0.0002	
2/13/2019	1430	0.17	261.0	674		21.7	103	23.1	0.272	0.599	0.00049	0.182	0.825	< 0.0004	50.5	0.0122	0.00026	0.0211	0.000130	0.00009	0.000250	0.00906	0.000196	0.0006		0.385	0.0002	
5/15/2019	1670	0.23	294.0	787	7	11.4	165	51.9	0.203	2.790	0.00032	1.60	3.18	< 0.0004	189	0.0123	0.00024	0.0177	0.00015	0.00007	0.00020	0.0107	0.00008	0.0007		0.517	0.0002	
8/21/2019	2590	0.31	482	1130	5	20.0	244	83.3	0.193	5.150	< 0.001	3.11	4.81	< 0.002	338	0.010	0.0004	0.0198	0.0002	< 0.00005	0.0002	0.0125	< 0.0002	0.0012		0.765	< 0.0005	11.300
11/20/2019	2810	0.23	579.0	1270	4	22.6	258	101	0.617	5.700	0.00143	8.35	6.07	< 0.0004	398	0.0269	0.00055	0.0157	0.000313	0.00016	0.0002	0.0221	0.0001	0.0018		0.820	0.0002	17.300
2/19/2020	1760	0.26	359.0	814	4	15.10	185	61.0	0.289	3.250	0.0004	2.90	4.28	< 0.0004	250	0.0156	0.0003	0.0188	0.000165	0.00013	0.0002	0.0133	0.00006	0.0008		0.635	0.0001	15.900
4/29/2020	1650	0.24	292.0	822	3	13.30	176	48.3	0.0316	3.070	0.0003	0.821	3.32	< 0.0004	234	0.0105	0.00023	0.0183	0.00008	0.0001	0.0002	0.0101	< 0.00005	0.0007		0.598	0.0002	
CIP took over sampling																												
9/23/2020																												
11/25/2020																												
3/8/2021	3600	0.13	950	1800	<0.13		320.00	110.0	0.320	9.80	<0.0017	11.00	7.70		700	0.019	<0.00075	0.017	<0.00031	<0.00020	<0.00098	0.018	<0.00045	<0.00089				20
4/1/2021	1900	0.20	440	1000	<0.13	18.00	210.0	63.0	0.490	4.50	<0.0017	2.80	5.50		310	0.040	<0.00075	0.0028	0.00086	0.00056	0.002	0.0230	0.00049	<0.00089	10.00	0.850	<0.0027	21
8/17/2021	2400	0.52	310	1200	<0.13	24.00	330.0	47.0	<0.034	3.20	<0.0017	0.15	3.00	0.0035	210	<0.015	<0.00075	0.028	<0.00062	<0.00020	<0.0025	0.011	<0.00045	0.0034	6.00	1.100	0.00041	13
11/17/2021	2800	0.16	650	1500	<0.13	27.00	240.0	86.0	0.260	7.30	0.0017	1.70	6.50	<0.0011	510	0.019	<0.00075	0.015	<0.00062	<0.00020	<0.0025	0.013	0.00096	<0.00089	8.50	0.950	<0.00020	18
3/1/2022	1400	0.14	210	720	<0.13	22.00	180.0	40.0	0.450	3.40	0.0025	0.58	3.30	<0.00061	170	0.029	<0.00028	0.039	<0.00027	0.00051	<0.0015	0.019	0.00046	<0.00074	7.70	0.610	<0.00047	17
4/11/2022	<780	0.17	200	820	<0.13	22.00	200.0	44.0	0.520	3.30	0.0021	0.33	3.40	<0.00061	190	0.030	0.00034	0.023	<0.00027	0.00046	<0.0015	0.020	0.00031	<0.00074	6.10	0.650	<0.00047	13.0
8/10/2022	2200	0.14	390	1100	<0.13	24.00	190.0	55.0	0.330	4.80	0.0038	0.93	4.90	<0.0011	360	0.016	<0.00075	0.016	<0.00062	<0.00020	<0.0025	0.014	<0.00045	<0.00089	7.90	0.750	<0.00020	17.0
11/1/2022	3200	0.14	640	1700	<0.13	32.00	260.0	80.0	0.350	8.60	<0.0017	0.45	6.50	<0.0011	650	0.018	<0.00075	0.016	<0.00062	<0.00020	<0.0025	0.012	<0.00045	<0.00089	5.80	1.000	<0.00020	12.0
3/16/2023	3000	0.06	560	1500	<0.13	30.00	240.0	71.0	0.390	8.90	<0.0017	0.88	5.80	<0.0011	610	0.017	<0.00075	0.013	<0.00062	<0.00020	<0.0025	0.015	<0.00045	<0.00089	6.50	1.000	<0.00020	14.0
4/19/2023	2500	0.15	440	1300	<0.13	27.00	210.0	53.0	0.280	8.00	<0.0017	0.53	4.90	<0.0011	440	0.016	<0.00075	0.014	<0.00062	<0.00020	<0.0012	0.014	<0.00045	<0.00089	6.70	0.810	<0.00020	14.0
9/12/2023	3100	0.13	600	1700	<0.13	34.00	250.0	64.0	0.110	10.00	<0.0017	5.60	5.60	<0.0011	720	<0.015	<0.00075	0.015	<0.00062	<0.00020	<0.0012	0.012	<0.00045	<0.00089	7.90	1.000	<0.00020	17.0
12/6/2023	4200	0.19	670	1900	<0.13	37.00	280.0	78.0	0.130	11.00	<0.0017	3.00	6.60	<0.0011	760	<0.015	<0.00075	0.015	<0.00062	<0.00020	<0.0012	0.014	<0.00045	<0.00089	6.30	1.200	<0.00020	13.0
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																												
5/16/2024	1700	0.19	250	970	<0.13	23.00	190.0	42.0	0.072	5.50	<0.0017	1.70	3.20	<0.0011	290	0.041	0.00088	0.020	<0.00062	0.00021	<0.0012	0.016	0.00050	<0.00089	6.30	0.640	<0.00020	14.0

Sediment Basin #3 Total

SAMPLING DATE Background	Type	Field Measurements pH	Cond microS/cm	Flow Rate ft^3/sec	Redox mv	Temperature oC	pH (Lab)	Alkalinity mg/L CaCO3	Acidity meq/L	TSS mg/L	Hg ppt	P mg/L	K mg/L	Ca mg/L	Mg mg/L
Sample Size		0	0	0			0	0	0	0	0	0	0	0	0
Average of detected		0.00	0	0.0			0.00	0.00	0.000	0.0	0	<0.03	0	0.000	0.0
Std.Dev. Of detected		NA	NA	NA			NA	NA	NA	NA	NA	NA	NA	NA	NA
Maximum of Detected		0.00	0	0.0			0.00	0.00	0.000	0.0	0	<0.03	0	0.000	0.0
Median of Detected		0.00	0	0.0			0.00	0.00	0.000	0.0	0	<0.03	0	0.000	0.0
Minimum of Detected		0.00	0	0.0			0.00	0.00	0.000	0.0	0	<0.03	0	0.000	0.0
% of Detected		#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DL												<0.03			
8/23/2016															
12/6/2016															
OSU Sampling Ended.															
2/21/2017	Total														
6/13/2017	Total														
9/13/2017															
2/7/2018				No Flow											
7/11/2018				No Flow											
10/17/2018				No Flow											
2/13/2019				No Flow											
5/15/2019				No Flow											
8/21/2019				No Flow											
11/20/2019				No Flow											
2/19/2020				No Flow											
4/29/2020				No Flow											
CIP took over sampling															
9/23/2020				No Flow											
11/25/2020				No Flow (Dry)											
3/8/2021				No Flow (Dry)											
4/1/2021				No Flow (Dry)											
8/17/2021				No Flow (Dry)											
11/17/2021				No Flow (Dry)											
3/1/2022				No Flow (Dry)											
4/11/2022				No Flow (Dry)											
8/1/2022				No Flow (Dry)											
11/1/2022				No Flow (Dry)											
3/1/2023				No Flow (Dry)											
4/19/2023				No Flow (Dry)											
9/12/2023				No Flow (Dry)											
12/4/2023				No Flow (Dry)											
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval														
5/16/2024				No Flow (Dry)											

SAMPLING DATE Background	S mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L
Sample Size	0	0	0	0	0	0	0	0	0	0	0	0
Average of detected	0	<0.03	0	<0.002	<0.001	<0.001	<0.001	0.00	0.000	<0.009	0.00	<0.0004
Std.Dev. Of detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Maximum of Detected	0	<0.03	0	<0.002	<0.001	<0.001	<0.001	0.00	0.000	<0.009	0.00	<0.0004
Median of Detected	0	<0.03	0	<0.002	<0.001	<0.001	<0.001	0.00	0.000	<0.009	0.00	<0.0004
Minimum of Detected	0	<0.03	0	<0.002	<0.001	<0.001	<0.001	0.00	0.000	<0.009	0.00	<0.0004
% of Detected	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DL		<0.03		<0.002	<0.001	<0.001	<0.001			<0.009		<0.0004

SAMPLING DATE Background	Cd mg/L	Co mg/L	Cr mg/L	Li mg/L	Ni mg/L	Pb mg/L	Sb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	V mg/L		
Sample Size	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of detected	<0.0004	<0.001	<0.001	0.0000	0.0000	<0.004	0.000	<0.012	0.000	0.00	<0.003	0.00	<0.003	<0.003
Std.Dev. Of detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Maximum of Detected	<0.0004	<0.001	<0.001	0.0000	0.0000	<0.004	0.000	<0.012	0.000	0.00	<0.003	0.00	<0.003	<0.003
Median of Detected	<0.0004	<0.001	<0.001	0.0000	0.0000	<0.004	0.000	<0.012	0.000	0.00	<0.003	0.00	<0.003	<0.003
Minimum of Detected	<0.0004	<0.001	<0.001	0.0000	0.0000	<0.004	0.000	<0.012	0.000	0.00	<0.003	0.00	<0.003	<0.003
% of Detected	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DL	<0.0004	<0.001	<0.001			<0.004		<0.012			<0.003		<0.003	<0.003

Sediment Basin #3 Dissolved

SAMPLING DATE Background	Type	Field Measurements pH	Cond microS/cm	Redox MV	pH (Lab)	Alkalinity mg/L CaCO3	Acidity meq/L	TDS mg/L	Floride mg/L	Chloride mg/L	SO4 mg/L	Hg ppt
Sample Size		0	0	0	0	0	0	0	0	0	0	0
Average of detected		0.00	0	0.00	0.0	0	0.00	0	0	0.0	0	0
Std.Dev. Of detected		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Maximum of Detected		0.00	0	0.00	0.0	0	0.00	0	0	0.0	0	0
Median of Detected		0.00	0	0.00	0.0	0	0.00	0	0	0.0	0	0
Minimum of Detected		0.00	0	0.00	0.0	0	0.00	0	0	0.0	0	0
% of Detected		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DL												
8/23/2016												
12/6/2016												
OSU Sampling Ended.												
2/21/2017	Dissolved											
6/13/2017	Dissolved											
9/13/2017												
2/7/2018												
7/11/2018												
10/17/2018												
2/13/2019												
5/15/2019												
8/21/2019												
11/20/2019												
2/19/2020												
4/29/2020												
CIP took over sampling												
9/23/2020	NO FLOW											
11/25/2020	NO FLOW (Dry)											
1/11/2021	NO FLOW (Dry)											
4/1/2021	NO FLOW (Dry)											
8/17/2021	NO FLOW (Dry)											
11/17/2021	NO FLOW (Dry)											
3/1/2022	NO FLOW (Dry)											
4/11/2022	NO Flow (Dry)											
11/1/2022	NO FLOW (Dry)											
3/1/2023	No Flow (Dry)											
4/19/2023	NO FLOW (Dry)											
9/12/2023	NO FLOW (Dry)											
12/4/2023	NO FLOW (Dry)											
		Sampling frequency Changed to Semi-Annual basis per ODNR Approval										
5/16/2024	NO FLOW (Dry)											

SAMPLING DATE Background	P mg/L	K mg/L	Ca mg/L	Mg mg/L	S mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L
Sample Size	0	0	0	0	0	0	0	0	0	0	0
Average of detected	<0.03	0.0	0	0	0	<0.03	0.000	<0.002	<0.001	<0.001	<0.001
Std.Dev. Of detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Maximum of Detected	<0.03	0.0	0	0	0	<0.03	0.000	<0.002	<0.001	<0.001	<0.001
Median of Detected	<0.03	0.0	0	0	0	<0.03	0.000	<0.002	<0.001	<0.001	<0.001
Minimum of Detected	<0.03	0.0	0	0	0	<0.03	0.000	<0.002	<0.001	<0.001	<0.001
% of Detected	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DL	<0.03					<0.03		<0.002	<0.001	<0.001	<0.001

SAMPLING DATE Background	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Co mg/L	Cr mg/L	Li mg/L	Ni mg/L	Pb mg/L	Sb mg/L	Se mg/L	Si mg/L	Sr mg/L	Tl mg/L	V mg/L
Sample Size	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average of detected	0	0.000	<0.009	0.000	<0.0004	<0.0004	<0.001	<0.001	0.000	0.000	<0.004	0.000	<0.012	0.0	0.0	<0.003	<0.003
Std.Dev. Of detected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Maximum of Detected	0	0.000	<0.009	0.000	<0.0004	<0.0004	<0.001	<0.001	0.000	0.000	<0.004	0.000	<0.012	0.0	0.0	<0.003	<0.003
Median of Detected	0	0.000	<0.009	0.000	<0.0004	<0.0004	<0.001	<0.001	0.000	0.000	<0.004	0.000	<0.012	0.0	0.0	<0.003	<0.003
Minimum of Detected	0	0.000	<0.009	0.000	<0.0004	<0.0004	<0.001	<0.001	0.000	0.000	<0.004	0.000	<0.012	0.0	0.0	<0.003	<0.003
% of Detected	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DL			<0.009		<0.0004	<0.0004	<0.001	<0.001			<0.004		<0.012			<0.003	<0.003

WD Pond 1 Total

SAMPLING DATE	Field Measurements: pH	Field Measurements: Cond microS/cm	Field Measurements: Redox mv	Field Measurements: Temperature °C	Field Measurements: Flow Rate ft^3/sec	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L
Sample Size	27	26	26	26	25	25	25	10	23	23	22	23	23	23	22
Average of detected	6.43	1557.55	138.85	15.65	0.01	14.41	-9.11	875.00	53	0.010	12.28	219.2	67.2	0.600	0.7555
Std.Dev. Of detected	1.05	826.65	81.11	8.29	0.01	20.73	106.86	509.78	217	0.005	5.70	126.7	39.5	0.694	0.6504
Maximum of Detected	8.70	3270.00	311.00	30.70	0.04	91.00	140.00	2000.00	1000	0.018	26.80	468.0	153.0	3.290	2.1700
Median of Detected	6.45	1295.00	128.65	14.54	0.01	6.00	10.00	825.00	3	0.008	10.50	190.0	58.0	0.397	0.4805
Minimum of Detected	4.15	475.00	17.10	1.70	0.00	4.00	-433.00	180.00	1	0.004	4.80	30.0	8.5	0.098	0.0560
% of Detected	96	100	100	100	20	68	64	100	91	48	100	100	100	96	100
DL							<2			<0.2					
5/17/2016	4.15	475	297	18.9		<2	<2			<0.09					
6/27/2016	4.45	1089	159	30.7		<2	19.5			0.006	7.9	101	63.7	1.34	0.056
8/23/2016	4.38	930	227	25.2		<0.4	28.5		5.5	0.004	8.7	90	54.0	0.99	0.062
12/6/2016															
2/21/2017															
6/13/2017															
9/13/2017															
11/8/2017	6.76	1180	186.4	17.8	dipped				21.40	< 0.09	7.84	201	23.7	0.566	0.797
2/7/2018	8.70	1059	85.5	1.7	dipped	4	10			< 0.09	6.78	156	37.9	0.339	0.501
5/2/2018	5.50	1950	240.6	24.7	0.0088	< 1	10		3.7	0.018	13.4	249	90.6	1.290	0.834
7/11/2018	7.00	3020	87.0	29.9	dipped	4	< 5		1	0.014	20.8	459	122	0.238	1.880
10/17/2018	6.80	2240	123.3	17.4	dipped	5	8		3.3	0.013	14.5	343	82.0	0.476	1.170
2/13/2019	7.00	930	52.5	3.2	0.0374	4	9		3	0.012	5.88	112	30.6	0.454	0.346
5/15/2019	6.40	3270	89.3	23.4	0.0066	< 3	30.9		0.8	0.018	26.8	384	153.0	3.290	2.170
8/21/2019	6.40	2900	37.7	23.3	dipped	< 5	10		0.7	0.008	17.3	468	116.0	0.468	1.940
11/20/2019	6.40	2250	39	9	dipped	< 5	8		0.9	0.005	18.9	351	92.6	0.622	0.978
2/19/2020	6.86	850	44	9	0.0044	6	9		2.7	0.005	8.2	130	35.1	0.279	0.268
4/29/2020	6.93	2090	17	20	0.0110	< 5	10		2.8	0.008	17.4	316	102.0	0.702	0.940
CIP took over sampling															
9/22/2020	7	2796	57	24.88		4.05	24.4		3	<0.2		391	138.0	0.568	1.800
11/24/2020	6	2370	194	5.08	dipped	22	140		1000						
3/18/2021	6.50	720	179	13.52	dipped	4	34	550	<1.0						
4/1/2021	6.22	1240	152	7.54	dipped	5.5	<5.0	930	<1.0		10	150	50.0	0.2900	
8/31/2021	8.61	535	236	12.46	dipped	5.5	4.3	180	13	<0.13	4.8	30	8.5	0.3000	0.099
12/10/2021	6.08	950	113	13	Dipped	16	20	700	31	<0.13	13	150	32.0	0.2700	0.400
3/7/2022	6.39	532	134	13.59	dipped	12	25	370	6	<0.13	5.4	70	18.0	0.1300	0.140
4/11/2022	6.10	1350	79	12	dipped	11	<5.0	2000	2.90	<0.13	9.6	190	58	0.1100	0.460
8/10/2022					Dry , Did not sample										
10/12/2022					Dry , Did not sample										
3/1/2023	6.12	1120	159	5.42	dipped	14.0	-24.90	720	7.90	<0.13	18	130	36	0.2	0.45
4/20/2023	6.49	1530	195	15.49	dipped	14.0	-75.0	1100	6.50	<0.13	14	170	58	0.18	0.52
9/6/2023					Dry , Did not sample										
12/6/2023	7.70	1730	116	7.43	dipped	91.0	-433.00	1200	2.90	<0.13	11	210	71	0.098	0.44
Sampling frequency Changed to Semi-Annual basis per ODNR Approval															
5/21/2024	6.11	1390	311	22.45	dipped	23.0	-21.30	1000	3.50	<0.13	10	190	73	<0.034	0.37

SAMPLING DATE	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	23	23	23	21	23	23	23	23	23	23	23	23	23	23	20	9	22	22
Average of detected	0.0015	0.32	4.9213	0.0017	36.5	0.0534	0.0047	0.0217	0.000557	0.00055	0.00046	0.0713	0.000321	0.00435	10.18	2.60	0.5130	0.000927
Std.Dev. Of detected	0.0007	0.27	3.5493	0.0021	29.5	0.0381	0.0050	0.0099	0.000397	0.00033	0.00037	0.0532	0.000389	0.00329	11.20	0.94	0.2999	0.001678
Maximum of Detected	0.0031	1.18	13.3000	0.0057	105.0	0.1680	0.0191	0.0447	0.001760	0.00131	0.00134	0.2440	0.001540	0.01280	54.00	4.10	1.0700	0.007100
Median of Detected	0.0013	0.21	3.9800	0.0009	27.0	0.0408	0.0024	0.0220	0.000506	0.00048	0.00025	0.0630	0.000195	0.00340	7.13	2.80	0.4100	0.000500
Minimum of Detected	0.0006	0.07	0.3800	0.0003	3.9	0.0150	0.0008	0.0071	0.000112	0.00020	0.00019	0.0096	0.000065	0.00100	1.57	0.80	0.0760	0.000192
% of Detected	65	96	100	48	100	91	96	100	74	74	57	100	61	57	100	100	100	73
DL										<0.00005	<0.0001			<0.0005				
5/17/2016																		
6/27/2016	0.002	0.188	5.87	<0.0001	3.86	0.10	0.0015	0.031	0.00088	0.0009	0.0002	0.1080	0.00051	0.0031			0.283	0.000214
8/23/2016	0.002	0.585	6.16	0.00027	4.52	0.08	0.0016	0.036	0.00080	0.0007	0.0002	0.0849	0.00061	0.0029			0.266	0.000197
12/6/2016																		
2/21/2017																		
6/13/2017																		
9/13/2017																		
11/8/2017	0.0017	1.18	1.46	0.0057	13.6	0.017	0.007	0.029	0.00011	0.00025	0.00094	0.0199	0.00154	0.0034	4.35		0.347	0.00054
2/7/2018	0.0009	0.09	2.13	0.0005	12.5	0.033	0.001	0.018	0.00016	0.00032	0.000188	0.0358	0.000074	0.0016	3.24		0.326	0.000192
5/2/2018	0.0018	0.20	6.35	0.0011	44.1	0.103	0.004	0.023	0.00076	0.00089	0.000243	0.126	0.000200	0.0094	10.1		0.583	0.000409
7/11/2018	0.0009	0.14	8.95	0.0057	78.9	0.035	0.015	0.045	0.00029	0.00032	0.00134	0.0871	0.000065	0.0057	10.5		0.987	0.000280
10/17/2018	0.0010	0.23	3.98	0.0007	51.2	0.036	0.013	0.031	0.00038	0.00028	0.000252	0.0633	0.000116	0.0037	11.5		0.776	0.0005
2/13/2019	0.0010	0.28	2.23	0.0009	15.6	0.053	0.002	0.019	0.00024	0.00050	0.000397	0.0416	0.000285	0.0026	7.35		0.238	0.0002
5/15/2019	0.0031	0.14	13.3	0.0010	105.0	0.168	0.019	0.026	0.00176	0.00131	0.0003	0.2440	0.000294	0.0128	17.1		1.07	0.0008
8/21/2019	0.0010	0.20	7.95	< 0.002	78.9	0.041	0.008	0.035	0.00059	0.00020	0.0009	0.0850	< 0.0002	0.0037	14.7		1.06	0.0006
11/20/2019	0.0006	0.07	5.33	< 0.0004	52.2	0.057	0.004	0.023	0.00050	0.00044	0.00025	0.0905	0.00010	0.0024	11.4		0.818	0.0005
2/19/2020	0.0012	0.16	3.22	0.0005	15.1	0.054	0.004	0.013	0.00019	0.00048	0.000493	0.0426	0.00010	0.001	54.0		0.313	0.000513
4/29/2020	0.0013	0.09	8.86	0.0008	65.1	0.104	0.005	0.024	0.00051	0.00100	0.000244	0.1380	0.00007	0.0042	14.2		0.834	0.00142
CIP took over sampling																		
9/22/2020	<0.002	<0.1	12.6		83.6	0.048	0.002	0.029	0.00051	0.000206	<0.002	0.1230	<0.001	<0.005	1.6			
11/24/2020																		
3/18/2021																		
4/1/2021	<0.0035	0.096	4.5		22.0	0.0530	<0.0041	0.014	0.00069	0.00081	<0.00063	0.0630	<0.0028	<0.006		3.2	0.37	0.0071
8/31/2021	0.00170	0.28	0.52	<0.0011	4.2	0.0280	0.00230	0.0071	0.00083	0.00049	<0.0025	0.0290	<0.00045	<0.00089	1.7	0.8	0.076	0.00096
12/10/2021	0.00150	0.74	1.1	<0.00061	16.0	0.0160	0.00660	0.015	0.00028	<0.00022	<0.0015	0.0190	0.00034	<0.0015	5.9	2.8	0.35	0.0004
3/7/2022	<0.0011	0.21	2.3	<0.00061	7.5	0.0150	0.00120	0.011	<0.00027	<0.00022	<0.0015	0.0150	0.00019	<0.00074	4.7	2.0	0.16	<0.00047
4/11/2022	<0.0011	0.170	3.0	<0.00061	27	0.0340	0.00120	0.013	<0.00027	0.00025	<0.0015	0.0510	<0.00017	<0.00074	8.9	4.1	0.45	<0.00047
8/10/2022																		
10/12/2022																		
3/1/2023	<0.0017	0.39	3.3	<0.0011	25	0.033	0.0011	0.0093	<0.00062	<0.00020	<0.0025	0.078	<0.00045	<0.00089	5.3	2.5	0.28	<0.00020
4/20/2023	<0.0017	0.44	3.5	<0.0011	30	0.018	0.0016	0.013	<0.00062	<0.00020	<0.0025	0.062	<0.00045	<0.00089	6.9	3.2	0.45	<0.00020
9/6/2023																		
12/6/2023	<0.0017	0.35	0.38	<0.0011	56	<0.015	0.00077	0.013	<0.00062	<0.00020	<0.0025	0.0096	<0.00045	<0.00089	4.2	2.0	0.77	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																		
5/21/2024	<0.0017	0.7	6.2	<0.0011	28	<0.015	0.00250	0.022	<0.00062	<0.00020	<0.0025	0.0240	<0.00045	<0.00089	6.0	2.8	0.48	<0.00020

WD Pond 1 Dissolved

SAMPLING	TDS	Fluoride	Chloride	SO4	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
DATE	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Size	24	25	25	25	20	22	25	25	25	25	25	25	25	21	25	25	25	25	25	25	25	25	25	25	15	9	22	22
Average of detected	1272	0.73	127.03	773	0.003	12.3	205	64	0.541	0.665	0.00145	0.1074	4.68	0.00160	33.48	0.0564	0.00314	0.0211	0.000492	0.000556	0.000334	0.0700	0.000198	0.0041	6.09	2.51	0.511	0.000453
Std.Dev. Of detected	771	0.51	101.40	454	0.002	5.5	120	36	0.719	0.600	0.00067	0.0976	3.17	0.00203	27.57	0.0385	0.00330	0.0097	0.000422	0.000328	0.000344	0.0508	0.000207	0.0034	3.32	0.91	0.296	0.000328
Maximum of Detected	2780	2.04	350.00	1620	0.007	25.2	476	140	3.160	2.040	0.00290	0.3800	12.60	0.00545	98.70	0.1640	0.01340	0.0439	0.001670	0.001240	0.001500	0.2390	0.000605	0.0136	14.70	4.10	1.070	0.001420
Median of Detected	965	0.48	92.00	601	0.003	10.5	170	57	0.272	0.450	0.00132	0.0845	3.99	0.00080	24.00	0.0430	0.00160	0.0190	0.000453	0.000470	0.000200	0.0590	0.000076	0.0031	5.10	2.60	0.391	0.000415
Minimum of Detected	180	0.21	7.59	87	0.002	4.9	33	10	0.024	0.050	0.00060	0.0020	0.37	0.00009	4.20	0.0110	0.00096	0.0095	0.000010	0.000200	0.000134	0.0096	0.000023	0.0009	1.50	0.71	0.084	0.000189
% of Detected	92	96	96	100	25	100	100	100	92	100	72	80	100	48	100	92	92	100	60	68	60	100	44	56	100	100	100	64
DL					<0.2															<0.00005	<0.0001			<0.0005				
5/17/2016	745	0.60	8.47	506			95	58.3	1.72	0.050	0.002	0.24	4.65		4.49	0.095	0.0014	0.0328	0.00001	0.0008	0.0003	0.098	0.000605	0.003	5.01			
6/27/2016	885	0.56	7.59	601		8.6	107	66.2	1.36	0.060	0.002	0.12	6.10	<0.0001	4.52	0.111	0.0015	0.0323	0.0009	0.0010	0.0002	0.112	0.000448	0.003			0.304	0.00022
8/23/2016	684	0.89	14.3	486		9.3	96	56.6	0.88	0.065	0.002	0.16	6.45	0.00009	5.37	0.089	0.0013	0.0342	0.0008	0.0007	0.0002	0.080	0.000422	0.003	5.01		0.287	0.00019
12/6/2016																												
2/21/2017																												
6/13/2017																												
9/13/2017																												
11/8/2017					< 0.09	7.11	196	23	0.0237	0.671	0.00123	0.03	1.4	0.00539	13.2	0.0143	0.00453	0.0226	0.000042	0.00021	0.000134	0.0186	0.000039	0.0027			0.341	0.000463
2/7/2018	832	0.37	39.10	529	< 0.09	7.10	159	38.2	0.300	0.545	0.00184	0.015	2.14	0.00045	12.8	0.0368	0.00096	0.0178	0.000159	0.0004	0.000158	0.0370	0.000023	0.0014			0.331	0.000192
5/2/2018	1520	1.17	161	1000	0.002	14.7	268	103	1.050	0.844	0.00184	0.040	6.68	0.00112	46.9	0.113	0.00308	0.0247	0.000707	0.00099	0.000188	0.139	0.000076	0.0096			0.627	0.000430
7/11/2018	2600	2.04	299	1620	0.003	19.7	445	124	0.204	1.87	0.00069	0.002	8.67	0.00545	75.9	0.0335	0.0134	0.0439	0.000264	0.00022	0.000427	0.0843	0.000049	0.0050			0.959	0.000264
10/17/2018	1850	1.3	165	1110		15.2	345	82.7	0.299	1.28	0.00075	0.01	3.99	0.0006	52	0.0392	0.00533	0.0316	0.000358	0.00029	0.00021	0.0631	0.00003	0.003			0.789	0.0004
2/13/2019	650	0.37	53.30	377		5.84	112	30.3	0.272	0.351	0.00084	0.036	2.24	0.0008	15.9	0.0518	0.00133	0.0187	0.000228	0.00051	0.0002	0.0419	0.00004	0.0023			0.239	0.0002
5/15/2019	2780	1.85	350	1600	0.003	25.2	377	140	3.16	2.04	0.00226	0.095	12.6	0.0009	98.7	0.1640	0.012	0.0255	0.00167	0.00124	0.0003	0.2390	0.000242	0.0136			1.01	0.0008
8/21/2019	2590	1.48	251	1520	< 0.002	17.7	476	116	0.474	1.98	0.00100	< 0.02	8.11	< 0.002	80.1	0.0421	0.00459	0.0366	0.000600	0.0002	0.0006	0.0859	< 0.0002	0.0036	14.7		1.07	0.0005
11/20/2019	1930	1.03	188	1150	< 0.002	18.6	343	89.9	0.5740	0.974	0.00060	< 0.02	5.07	< 0.0004	51.1	0.0580	0.00263	0.0231	0.000464	0.00044	0.0002	0.0895	< 0.00005	0.0022	11.4		0.792	0.0005
2/19/2020	744	0.42	61.30	436	0.002	8.06	130	35.3	0.1950	0.270	0.00080	0.04	3.18	0.0004	15.3	0.0542	0.00260	0.0122	0.000173	0.00047	0.0002	0.0424	< 0.00005	0.0009			0.307	0.000515
4/29/2020	2100	0.99	228.00	1240	0.007	18	327	107	0.378	0.93	0.001	< 0.02	9	0.0008	69	0.104	0.00453	0.0242	0.000453	0.00096	0.0002	0.136	< 0.00005	0.0037			0.866	0.00142
CIP took over sampling																												
\		0.816	288	1510																								
11/24/2020		0.78	230	1000	<0.2		270	100	0.48	1.30	<0.002	<0.1	9.8		61	0.053	0.0013	0.019	<0.001	<0.001	<0.002	0.099	<0.001	<0.005	2.563			
3/18/2021	550	0.29	50	300	<0.13		93	28	0.11	0.22	<0.0017	<0.047	2.5		13	0.036	0.0017	0.0095	<0.00031	0.00034	<0.00098	0.039	<0.00045	<0.00089	4.5			
4/1/2021	930	0.45	92	540	<0.13	10	140	48	0.26	0.33	<0.0017	0.074	4.2		21	0.048	0.0016	0.013	0.00057	0.00049	0.0015	0.058	<0.00045	<0.00089	5.8	2.7	0.32	<0.0027
8/31/2021	180	0.21	10	87	<0.13	4.9	33	9.5	0.19	0.11	0.0029	0.059	0.42	<0.0011	4.2	0.043	0.0012	0.01	<0.00062	0.00022	<0.0025	0.031	<0.00045	<0.00089	1.5	0.71	0.084	<0.00020
12/10/2021	700	0.51	55	460	<0.13	13	130	28	0.13	0.34	0.0016	0.26	0.51	<0.00061	15	0.011	0.0021	0.013	<0.00018	<0.00022	<0.0015	0.015	0.00020	<0.0015	5.5	2.6	0.3	0.00025
3/7/2022	370	0.21	28	230	<0.13	5.8	85	21	0.06	0.18	0.0011	0.14	2.8	<0.00061	8.4	0.017	0.0012	0.011	<0.00027	<0.00022	<0.0015	0.019	<0.00017	<0.00074	4.7	2.2	0.18	<0.00047
4/11/2022	2000	0.45	90	600	<0.13	9.5	200	56	0.063	0.45	0.0014	0.063	3.1	<0.00061	28	0.033	0.0011	0.014	<0.00027	<0.00022	<0.0015	0.051	<0.00017	<0.00074	8.7	4.1	0.45	<0.00047
8/10/2022																												
10/12/2022																												
3/1/2023	720	0.27	62	390	<0.13	18	130	35	0.15	0.44	<0.0017	0.19	3.3	<0.0011	24	0.032	<0.00075	0.0098	<0.00062	<0.00020	<0.0025	0.079	<0.00045	<0.00089	5.1	2.4	0.28	<0.00020
4/20/2023	1100	0.43	110	620	<0.13	14	170	57	0.11	0.52	<0.0017	0.096	3.5	<0.0011	30	0.019	0.0012	0.013	<0.00062	<0.00020	<0.0012	0.059	<0.00045	<0.00089	6.8	3.2	0.44	<0.00020
9/6/2023																												
12/6/2023	1200	0.39	130	740	<0.13	11	220	73	<0.034	0.45	<0.0017	0.10	0.37	<0.0011	59	<0.015	<0.00075	0.013	<0.00062	<0.00020	<0.0012	0.0096	<0.00045	<0.00089	4.3	2.0	0.79	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																												
5/21/2024	1000	0.45	92	680	<0.13	10	190	72	<0.034	0.36	<0.0017	0.38	6.1	<0.0011	28	<0.015	0.00160	0.022	<0.00062	<0.00020	<0.0012	0.0240	<0.00045	<0.00089	5.8	2.7	0.47	<0.00020

WD Pond 2 Total

SAMPLING	pH	Field Measurements Cond	Redox	Temperature	Flow Rate	Alkalinity	Acidity	TSS	Hg	K	Ca	Mg	Al	B	Cu	Fe	Mn	Mo	Na	Zn	As	Ba	Be	Cd	Cr	Ni	Pb	Se	SiO2	Si	Sr	Tl
DATE		microS/cm	mv	°C	ft³/sec	mg/L CaCO3	mg/L CaCO3	mg/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Size	32	31	31	31	28	30	30	31	27	26	28	28	28	27	28	28	28	27	28	28	28	28	28	28	28	28	28	28	21		27	27
Average of detected	7.24	1786.52	121.25	16.16	0.01	61.17	-57.18	6	1.208	7	258.0	75	0.12	0.5106	0.0009	0.217	0.7898	0.00229	45.8	0.012362	0.0018	0.0127	0.0000717	0.000148	0.000252	0.0116	0.000134	0.0033	7.01		0.8124	0.000544
Std.Dev. Of detected	0.75	306.57	87.89	8.44	0.01	21.43	83.88	8	2.679	3	55.9	17	0.12	0.2235	0.0004	0.177	0.7285	0.00157	13.0	0.018964	0.0012	0.0046	0.0000832	0.000182	0.000140	0.0139	0.000123	0.0019	3.23		0.1798	0.001282
Maximum of Detected	9.06	2290.00	347.10	30.10	0.03	110.00	2.50	39	6.000	17	390.0	98	0.46	0.9800	0.0017	0.710	2.8500	0.00581	67.0	0.082000	0.0055	0.0250	0.0003100	0.000640	0.000702	0.0670	0.000368	0.0067	15.90		1.1000	0.004600
Median of Detected	7.32	1820.00	123.50	17.20	0.01	61.25	-36.35	3	0.005	7	259.0	79	0.08	0.5040	0.0008	0.178	0.5100	0.00179	45.9	0.005700	0.0015	0.0123	0.0000400	0.000070	0.000203	0.0064	0.000084	0.0033	7.50		0.8040	0.000131
Minimum of Detected	5.70	934.00	-41.50	3.10	0.00	23.60	-356.00	0	0.002	2	130.0	26	0.01	0.1560	0.0004	0.019	0.0470	0.00070	21.7	0.002000	0.0006	0.0038	0.0000060	0.000010	0.000100	0.0016	0.000030	0.0008	2.70		0.3400	0.000067
% of Detected	97	100	97	100	43	100	7	84	19	96	100	93	86	100	61	93	100	59	96	68	93	100	54	61	57	100	50	68	100		93	44
DL							<2		<0.2															<0.00005	<0.0001			<0.0005				
5/17/2016	7.46	1616	68.20	17.8		47.2	<2	8.00	<0.09																							
6/27/2016	7.58	1800	13.90	25.3		65.2	<2	1.80	<0.005	9.00	234	87.0	0.025	0.156	0.0011	0.186	1.09	0.00308	36.2	0.00200	0.0011	0.0220	<0.00002	0.00002	0.000100	0.006	0.00006	0.003			1.00	0.000068
8/23/2016	8.25	1877	3.40	26.4	0.0022	57.6	<0.4	3.5	0.005		294	72.2	0.058	0.291	0.0013	0.159	0.44	0.00581	38.4	0.00200	0.0018	0.0199	0.000010	0.00003	0.000200	0.004	0.00009	0.007			1.08	0.000344
12/6/2016	7.85	1936	62.30	9.4	no flow	45.2	<0.4	0.5	0.003	7.70	326	88.8	0.079	0.447	0.0006	0.119	0.27	0.00215	48.3	0.00390	0.0010	0.0124	0.000030	0.00005	0.000200	0.007	0.00008	0.006			1.27	0.000067
2/21/2017	7.42	1915	123.50	9.4		61.3	0.2	2.7	6.000	7.45	291	68.4	0.083	0.348	0.0007	0.198	1.83	0.00278	38.7	0.01050	0.0013	0.0128	0.000031	0.00016	0.000125	0.022	0.00008	0.006			0.97	0.000133
6/14/2017	8.50	1857	347.10	30.1	0.022	23.6	2.5	0.8		6.71	291	65.7	0.039	0.403	0.0011	0.066	0.16	0.00386	34.1	0.00300	0.0021	0.0156	0.000016	0.00002	0.000217	0.004	0.00009	0.004			0.86	0.000128
9/13/2017																																
11/8/2017	6.06	1366	250.80	17.2	0.0132			6.2	< 0.09	6.27	211	41.1	0.172	0.293	0.00114	0.322	0.532	0.00178	22.2	0.01200	0.00228	0.014	0.000062	0.00010	0.000419	0.00814	0.000355	0.0038			0.571	0.000106
2/7/2018	8.20	2038	123.00	3.1	0.0264	71.40	< 5	2.2	< 0.09	8.44	294	86.8	0.205	0.305	0.00079	0.577	2.85	0.00109	45.9	0.00338	0.00093	0.0121	0.000177	0.00028	0.000178	0.0330	0.000052	0.0049	7.58		0.968	0.000087
5/2/2018	7.60	1800	300.20	27.9	0.0132	45.80	< 5	0.3	0.005	5.73	288	72.0	0.0711	0.727	0.00064	0.095	0.488	0.00168	31.8	0.0049	0.00138	0.00791	0.000044	0.00008	0.000205	0.0131	0.000040	0.0046	6.90		0.759	0.000168
7/11/2018	7.80	2100	185.90	29.1	0.0022	27.30	< 5	< 0.3	< 0.002	6.67	354	80.3	0.0216	0.865	0.00045	0.019	0.0524	0.00548	41.8	0.002	0.00211	0.0116	0.000006	0.00001	0.000276	0.00269	0.000030	0.0046	5.27		1.01	0.000129
10/17/2018	6.50	1720	187.0	17.1	0.0066	65.00	< 8	0.7	< 0.002	7.06	248	76.7	0.0113	0.459	0.00042	0.034	0.055	0.001	35.6	0.0020	0.00123	0.00950	0.00002	0.00002	0.0002	0.00373	< 0.00002	0.002	4.32		0.79	< 0.0001
2/13/2019	6.50	1360	83.6	3.9	0.0330	35.40	< 8	3	0.030	5.12	228	44.4	0.2930	0.505	0.00170	0.365	1.52	0.002	21.7	0.0229	0.00545	0.0154	0.000144	0.00021	0.000702	0.0249	0.000368	0.0051	9.05		0.532	0.0003
5/15/2019	7.10	1830	15.2	22.9	0.0110	49.90	< 8	< 0.3	0.002	6.21	266	85.9	0.0285	0.565	0.00046	0.09	1.01	0.001	41.5	0.0020	0.00157	0.00631	0.00004	0.00004	0.0002	0.0101	0.00003	0.0015	15.9		0.906	< 0.0001
8/21/2019	6.40	1850	44.4	23.3		68.80	< 8	1.7	< 0.002	6.35	278	83.5	0.0600	0.504	0.00100	0.04	0.283	< 0.002	42.3	< 0.004	0.00242	0.0128	< 0.0001	< 0.00005	0.0003	0.00309	< 0.0002	0.0008	9.89		0.947	< 0.0005
11/20/2019	5.70	1800	60.4	8.4	0.0022	61.20	< 8	< 0.4	< 0.002	8.42	258	83.3	0.0273	0.368	0.00060	0.04	0.225	0.001	47.2	0.0076	0.00088	0.0119	0.00004	0.00005	0.00025	0.00942	< 0.00005	0.0023	4.76		0.918	< 0.0001
2/19/2020	6.64	1310	47	9	0.0176	43.40	< 8	2	< 0.002	6.74	196	71.9	0.1480	0.253	0.00090	0.144	1.66	< 0.0004	44.8	0.0336	0.00057	0.0106	0.000116	0.00023	0.00026	0.0302	0.00009	0.0022	7.6		0.684	< 0.0001
4/29/2020	7.77	1560	-42	20	0.0220	41.70	< 8	0.5	< 0.002	6.76	226	89.7	0.0301	0.545	0.00040	0.137	0.909	< 0.0004	49.4	0.0057	0.00068	0.00378	0.00003	0.00007	0.0002	0.0168	< 0.00005	0.001	7.5		0.804	< 0.0001
CIP took over sampling																																
9/23/2020	7.54	2123	11	24.24	Dipped (No Flow)	82.00	-47.40	3	<0.2		260	97.5	<0.05	0.512	<0.002	<0.1	0.047		59.1	<0.02	0.00075	0.008	<0.001	<0.001	<0.002	0.0028	<0.001	<0.005	2.88			
11/24/2020	7.28	2020	162	4.65	Dipped (No Flow)	76.00	-64.30	6																								
1/15/2021	6.62	1280	129	6.21	Dipped (No Flow)	56	-25.9	14																								
4/1/2021	6.77	1810	144	7.78	Dipped (No Flow)	57	-24.8	<1.0		7.9	220	85.0	<0.047		<0.0035	0.17	0.71	<0.0049	59.0	<0.0097	<0.0041	0.011	<0.00060	0.00051	<0.00063	0.0150	<0.0028	<0.0060		3.1	0.81	0.0046
8/17/2021	9.06	1480	218	24.45	Dipped (No Flow)	70	-55.70	2.00	<0.13	1.7	210	79	<0.034	0.48	<0.0017	0.048	0.16	<0.0011	53	<0.015	<0.00075	0.0063	<0.00062	<0.00020	<0.0025	0.0016	<0.00045	<0.00089	2.7	1.3	0.79	<0.00020
12/20/2021	7.77	1820	53	10.39	Dipped (No Flow)	28	-5.90	7.30	<0.13	5	170	58	0.39	0.34	0.0013	0.71	2.3	<0.00061	61	0.082	0.001	0.011	0.00031	0.00064	<0.0015	0.067	0.00029	<0.0015	11	5.3	0.57	<0.00015
3/7/2022	7.29	934	119	11.61	Dipped (No Flow)	67	-39.70	4.60	<0.13	4.8	130	26	0.15	0.17	<0.0011	0.21	0.39	0.00079	22	0.0057	0.0016	0.017	<0.00027	<0.00022	<0.0015	0.0057	0.00024	0.00096	3.9	1.8	0.34	<0.00047
4/4/2022	7.07	2210	139	7.03	Dipped (No Flow)	48	-33.00	3.30	<0.13	8.7	310	95	0.058	0.91	<0.0011	0.20	0.47	<0.00061	57	0.0077	0.0013	0.015	<0.00027	<0.00022	<0.0015	0.012	<0.00017	0.0012	9.6	4.5	0.85	<0.00047
7/18/2022	7.52	2190	142	22.57	Dipped (No Flow)	100.00	-81.00	4.30	<0.13	7.3	320	95	0.069	0.90	<0.0017	0.23	0.57	<0.0011	67	<0.015	0.0017	0.012	<0.00062	<0.00020	<0.0025	0.0034	<0.00045	<0.00089	8	3.8	1.1	<0.00020
10/13/2022	7.32	2290	155	14.01	Dipped (No Flow)	100.00	-61.50	11.00	<0.13	17.0	390	78	0.096	0.98	<0.0017	0.30	1.4	0.0018	58	<0.015	0.0039	0.025	<0.00062	<0.00020	<0.0025	0.0048	<0.00045	<0.00089	4	1.9	1.0	<0.00020
3/1/2023	6.49	2040	117	5.82	Dipped (No Flow)	68.00	-17.50	5.30	<0.13	12	260	86	0.46	0.62	<0.0017	0.52	0.19	<0.0011	65	<0.015	0.00079	0.014	<0.00062	<0.00020	<0.0025	0.0063	<0.00045	<0.00089	10	4.8	0.8	<0.00020
4/19/2023	7.33	1930	181	17.56	Dipped (No Flow)	78.00	-356.00	15.00	<0.13	10	230	77	0.12	0.64	<0.0017	0.39	0.25	0.0016	60	<0.015	0.0017	0.013	<0.00062	<0.00020	<0.0025	0.0029	<0.00045	0.0014	4.7	2.2	0.77	0.00040
9/6/2023	6.13	1770	180	23.77	Dipped (No Flow)	110.00	-25.1	39.0	<0.13	8.4	210	66	0.085	0.55	<0.0017	0.26	1.4	<0.0011	51	<0.015	0.0047	0.015	<0.00062	<0.00020	<0.0025	0.0021	<0.00045	<0.00089	7.5	3.5	0.69	<0.00020
12/4/2023					Dry (No Sample)																											
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																
5/17/2024	6.93	1750	134	20.35	Dipped (No Flow)	85.00	-79.80	4.10	<0.13	7.3	230	71	<0.034	0.65	<0.0017	0.14	0.86	<0.0011	52	0.022	0.0019	0.011	<0.00062	<0.00020	<0.0025	0.0022	<0.00045	<0.00089	4.2	2	0.79	<0.00020

WD Pond 2 Dissolved

SAMPLING DATE	TDS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	32	30	30	30	25	27	30	30	30	30	30	30	30	27	30	30	30	30	30	30	30	30	30	30	24	11	27	27
Average of detected	1460	0.49	104.3	888	1.501	11.35	248	75.1	0.0372	1.208	0.00138	0.374	0.82	0.00233	54.65	0.0157	0.00143	0.01245	0.00005	0.00369	0.00034	0.01234	0.000231	0.003102	6.44	3.04	0.813	0.000131
Std.Dev. Of detected	254	0.16	30.3	181	2.121	19.49	56	15.9	0.0358	3.934	0.00125	0.939	0.87	0.00157	46.52	0.0209	0.00080	0.00415	0.00006	0.01451	0.00044	0.01296	0.000591	0.001957	3.26	1.31	0.207	0.000071
Maximum of Detected	1900	1.04	174.0	1260	3.000	108.00	370	95.0	0.1600	22.000	0.00580	3.590	3.58	0.00571	286.00	0.0920	0.00400	0.02280	0.00020	0.06000	0.00200	0.06100	0.002100	0.006500	15.90	5.50	1.300	0.000300
Median of Detected	1500	0.47	105.0	899	1.501	7.46	236	78.0	0.0327	0.478	0.00093	0.052	0.52	0.00185	46.75	0.0077	0.00125	0.01205	0.00003	0.00009	0.00020	0.00801	0.000047	0.002650	6.60	3.20	0.809	0.000121
Minimum of Detected	650	0.20	45.0	370	0.001	1.60	130	25.0	0.0067	0.110	0.00042	0.005	0.02	0.00060	20.30	0.0006	0.00045	0.00370	0.00001	0.00001	0.00013	0.00160	0.000009	0.000700	0.28	1.20	0.320	0.000058
% of Detected	91	100	100	100	8	100	100	97	57	100	67	50	100	56	100	70	83	100	50	57	57	93	40	73	100	100	100	37
DL					<0.2															<0.00005	<0.0001			<0.0005				
5/17/2016	1300	0.45	72.3	783			205	82.5	0.0594	0.110	0.0008	0.24	1.55		42.5	0.0076	0.00100	0.0155	<0.00004	<0.00004	<0.0001	0.0161	0.000081	0.0060	4.23			
6/27/2016	1530	0.52	82.4	917		9.5	232	84.0	0.0091	0.151	0.0008	0.04	1.03	0.00308	35.7	0.0033	0.00110	0.0228	<0.00002	0.00002	0.000200	0.0063	0.000033	0.0032			0.992	0.000058
8/23/2016	1540	0.62	71.4	968		10.3	302	74.3	0.0327	0.298	0.0014	0.02	0.36	0.00571	40.2	0.0041	0.00153	0.0198	0.000007	0.00003	0.000200	0.0042	0.000042	0.0065	3.76		1.11	0.000176
12/6/2016	1610	0.52	89.3	988	<0.09	9.52	332	92.0	0.0331	0.471	0.0010	0.02	0.29	0.00240	50.9	0.0356	0.00087	0.0122	0.000010	0.06000	0.000300	0.0078	0.000029	0.0060	0.28		1.3	0.000062
2/21/2017	1610	0.45	77.1	986	3.00	7.41	294	69.9	0.0347	0.349	0.0009	0.055	1.79	0.00290	39.3	0.0097	0.00111	0.0129	0.000010	0.00016	0.000236	0.0205	0.000095	0.0056			0.987	0.000125
6/14/2017	1630	0.51	62.6	1120	0.0010	4.15	182	41.1	0.0190	0.388	0.0023	0.013	0.13	0.00394	21.3	0.0103	0.00190	0.0165	0.000017	0.00003	0.000435	0.0042	0.000051	0.0045			0.52	0.000124
9/13/2017																												
11/8/2017					< 0.09	6.44	215	41.6	0.0350	0.299	0.0013	0.061	0.54	0.00185	22.8	0.0108	0.00174	0.0123	0.000032	0.00009	0.000133	0.0082	0.000035	0.0035			0.582	0.000096
2/7/2018	1730	0.42	101	1090	< 0.09	8.10	289	84.6	0.0584	0.297	0.0012	0.219	2.79	0.00105	43.9	0.0345	0.00068	0.0121	0.000144	0.00033	0.000157	0.0329	0.000009	0.0045	7.58		0.949	0.000083
5/2/2018	1500	0.66	77.1	1010	< 0.002	6.19	306	81.0	0.0524	0.694	0.00073	0.008	0.512	0.00183	33.5	0.0050	0.00125	0.00816	0.000031	0.00009	0.000190	0.0138	0.000063	0.0045	6.9		0.809	0.000170
7/11/2018	1890	1.04	89.4	1260	< 0.002	6.14	337	79.7	0.00671	0.804	0.00042	< 0.002	0.0417	0.00520	39.3	0.0006	0.00202	0.0107	0.000006	0.00001	0.000215	0.00263	< 0.000004	0.0044	5.3		0.949	0.000117
10/17/2018	1370	0.65	89.2	844		7.46	246	75.9	0.00894	0.507	0.00042	0.005	0.0604	0.001	35.4	0.0010	0.00110	0.00958	0.00002	0.00002	0.0002	0.00381	< 0.00002	0.0018	4.3		0.785	< 0.0001
2/13/2019	1140	0.44	50.4	676		4.83	213	41.5	0.0413	0.485	0.00097	0.02	1.41	0.002	20.3	0.0227	0.00291	0.0136	0.00009	0.0002	0.000314	0.0248	0.00002	0.0046			0.5	0.0003
5/15/2019	1580	0.58	96.8	959	< 0.002	108	269	71.8	0.0292	22.000	0.00045	3.59	3.58	0.001	286.0	0.0020	0.00152	0.00663	0.00003	0.00003	0.000215	0.0105	< 0.00002	0.0015	15.9		0.744	< 0.0001
8/21/2019	1580	0.62	99.7	946	< 0.002	6.19	274	82.4	< 0.020	0.500	< 0.001	< 0.02	0.246	< 0.002	41.8	0.0040	0.00238	0.013	< 0.0001	< 0.00005	0.0004	0.00301	< 0.0002	0.0007	9.89		0.927	< 0.0005
11/20/2019	1480	0.43	122	866	< 0.002	8.18	250	79.8	0.0200	0.350	0.00060	< 0.02	0.222	0.0006	45.5	0.0077	0.00081	0.0117	0.00004	0.00005	0.0002	0.00938	< 0.00005	0.0021	4.76		0.886	< 0.0001
2/19/2020	1220	0.32	109.00	720	< 0.002	6.55	191	70.8	0.0223	0.249	0.00080	< 0.02	1.59	< 0.0004	44.4	0.0328	0.00047	0.0103	0.00008	0.00024	0.0002	0.0301	< 0.00005	0.0021	7.6		0.676	< 0.0001
4/29/2020	1650	0.45	110.00	956	< 0.002	6.99	230	90.5	0.0100	0.550	0.00060	< 0.02	0.962	< 0.0004	50.8	0.0056	0.00057	0.0037	0.00003	0.00006	0.000201	0.0164	< 0.00005	0.001			0.811	< 0.0001
CIP took over sampling																												
9/23/2020	1470	0.516	174	920																								
11/24/2020	1500	0.52	160	840	<0.2		240	95.0	<0.05	0.430	<0.002	<0.1	0.045		61.0	<0.02	<0.005	0.009	<0.001	<0.001	<0.002	0.0043	<0.001	0.0014	5.6			
1/15/2021	1200	0.3	120	700	<0.13		190	71.0	<0.034	0.280	<0.0017	<0.047	1.5		48.0	0.0270	<0.00075	0.013	<0.00031	0.0002	<0.00098	0.0230	<0.00045	0.0015	6.6			
4/1/2021	1400	0.37	140	790	<0.13	8.1	200	85.0	<0.034	0.380	<0.0017	0.052	1.1	<0.0049	56.0	<0.0097	<0.00075	0.0099	<0.00031	<0.00020	0.002	0.0130	<0.00045	0.00098	6.8	3.2	0.82	<0.0027
8/17/2021	1400	0.5	120	780	<0.13	1.6	210	78.0	<0.034	0.460	<0.0017	<0.047	0.016	<0.0011	53.0	<0.015	<0.00075	0.0063	<0.00062	<0.00020	<0.0025	0.0016	<0.00045	<0.00089	2.6	1.2	0.77	<0.00020
12/20/2021	1200	0.29	120	640	<0.13	6.8	190	66.0	0.1600	0.790	0.00580	1.2	1.7	<0.00061	99.0	0.0920	0.00045	0.012	0.00020	0.0012	<0.0015	0.0610	0.00210	<0.0015	12.0	5.5	0.65	<0.00015
3/7/2022	650	0.20	45	370	<0.13	4.8	130	25	<0.016	0.180	<0.0011	<0.028	0.25	0.00091	21.0	0.0043	0.0013	0.015	<0.00027	<0.00022	<0.0015	0.0053	0.00021	0.00086	3.4	1.6	0.32	<0.00047
4/4/2022	1600	0.48	110	1100	<0.13	8.4	300	93	<0.016	0.870	0.0029	0.078	0.43	<0.00061	57	0.0098	0.001	0.017	<0.00027	<0.00022	<0.0015	0.011	<0.00017	0.0010	9.1	4.3	0.83	<0.00047
7/18/2022	1900	0.69	130	1100	<0.13	7.4	330	94	<0.034	0.97	0.002	<0.047	0.52	<0.0011	67	<0.015	0.0014	0.013	<0.00062	<0.00020	<0.0025	0.0031	<0.00045	<0.00089	8.4	3.9	1.1	<0.00020
10/13/2022	1800	0.59	130	1100	<0.13	16	370	74	<0.034	0.97	0.0023	<0.047	0.023	0.0015	55	<0.015	0.0016	0.021	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	<0.00089	3.7	1.7	0.96	<0.00020
3/1/2023	1500	0.34	140	880	<0.13	11	220	77	<0.034	0.53	<0.0017	<0.047	0.015	<0.0011	59	<0.015	<0.00075	0.0094	<0.00062	<0.00020	<0.0025	0.0029	<0.00045	<0.00089	7.6	3.5	0.69	<0.00020
4/19/2023	1500	0.39	130.00	850	<0.13	10	240	80	<0.034	0.67	<0.0017	<0.047	0.28	<0.0011	61	<0.015	0.0012	0.012	<0.00062	<0.00020	<0.0012	0.0034	<0.00045	<0.00089	6.6	3.1	0.79	<0.00020
9/6/2023	1300	0.41	110	700	<0.13	8.5	210	66	<0.034	0.54	<0.0017	<0.047	0.75	<0.0011	52	<0.015	0.004	0.012	<0.00062	<0.00020	<0.0012	<0.0015	<0.00045	<0.00089	7.3	3.4	0.7	<0.00020
12/4/2023	Dry (No Sample																											
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																												
5/17/2024	1200.00	0.40	100.00	780.00	<0.13	7.9	230	71	<0.034	0.67	<0.0017	<0.047	0.87	<0.0011	57	<0.015	0.0018	0.012	<0.00062	<0.00020	<0.0012	0.0024	<0.00045	<0.00089	4.3	2	0.79	<0.00020

ED Pond 1 Total

SAMPLING DATE	pH	Cond microS/cm	Redox mv	Temperature °C	Flow Rate ft³/sec	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TSS mg/L	Floride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L
	Field Measurements															
Sample Size	15	14	14	14	25	9	9	14	7	7	7	11	7	12	12	12
Average of detected	6.89	2200.28	160.76	14.45	0.00	48.49	-108.32	24.08	1	137.71	1171.43	0.17	29.571	338.3	37	0.2672
Std.Dev. Of detected	0.87	1055.33	41.49	7.14	NA	21.81	177.99	34.78	0	113.62	249.16	NA	15.317	137.2	31	0.4083
Maximum of Detected	8.62	3960.00	217.00	30.16	0.00	74.00	25.00	120.00	1	300.00	1500.00	0.17	58.000	580.0	96	1.4000
Median of Detected	6.97	2350.00	161.50	14.25	0.00	50.00	-27.10	11.50	1	62.00	1300.00	0.17	29.000	310.0	28	0.1200
Minimum of Detected	5.44	561.00	73.00	2.31	0.00	9.50	-547.00	2.00	0	40.00	810.00	0.17	11.000	190.0	4	0.0470
% of Detected	93	100	100	100	0	100	11	100	100	100	100	9	100	100	100	83
DL							<2					<0.2				
5/17/2016																
8/23/2016																
12/6/2016																
2/21/2017																
6/13/2017																
9/13/2017																
2/7/2018					No Flow											
5/2/2018					No Flow											
7/11/2018					No Flow											
10/17/2018					No Flow											
2/13/2019					No Flow											
5/15/2019					No Flow											
8/21/2019					No Flow											
11/20/2019					No Flow											
2/19/2020					No Flow											
4/29/2020					No Flow											
CIP took over sampling																
9/23/2020	6.86	3004	86	17	Dipped (no Flow)	48.9	-8.85	26				<0.2		579	28.5	<0.05
11/24/2020	7.64	1530	163	11	Dipped (no Flow)	50	-15	86								
1/15/2021	7.05	598	141	2.31	Dipped (no Flow)			12								
4/1/2021	5.51	561	160	5.24	Dipped (no Flow)			2						270	6.2	0.0470
8/17/2021					DRY											
11/17/2021	8.62	911	152	14.78	Dipped (no Flow)			14				<0.13		190	3.9	0.120
3/11/2022	6.52	3500	73	13.71	Dipped (no Flow)			3.9				<0.13		220	96.0	0.270
4/5/2022	6.89	3960	186	10.21	Dipped (no Flow)			13.0				<0.13		240	89	0.120
8/9/2022	7.17	3130	194	30.16	Dipped (no Flow)	58.00	-27.10	4.80	0.83	300	1300	<0.13	17	320	57	0.089
11/1/2022	7.68	2750	217	15.30	Dipped (no Flow)	37.00	-10.20	23.00	0.80	230	1300	<0.13	11	330	41	<0.034
3/7/2023	6.02	1990	175	11.55	Dipped (no Flow)	9.50	25.00	6.10	0.36	62	1100	<0.13	33	380	15	0.15
4/19/2023	7.13	2250	158	19.24	Dipped (no Flow)	23.00	-154.00	11.00	0.56	42	1300	<0.13	29	460	16	0.087
9/12/2023	5.44	2520	217	19.62	Dipped (no Flow)	68.00	-174.00	120	1.20	40	1500	0.17	36	580	13	1.4
12/5/2023	7.48	1650	153	9	Dipped (no Flow)	68.00	-547.00	5.30	0.61	50.00	810.00	<0.13	58	300	27	0.33
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval															
5/20/2024	6.46	2450	176	22.44	Dipped (no Flow)	74.00	-63.70	10.00	0.37	240.00	890.00	<0.13	23	190	55	0.059

SAMPLING DATE	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	Si mg/L	SiO2 mg/L	Sr mg/L	Tl mg/L
Sample Size	11	12	12	12	7	12	12	12	12	12	12	12	12	12	12	11	11	10	10
Average of detected	4.18	0.01	0.8800	4.53	0.01	173.6250	0.027500	0.128117	0.0232	0.00000	0.00043	0.00190	0.02179	0.00230	0.0037	2.8220	6.0687	0.7130	0.000382
Std.Dev. Of detected	3.20	0.00	1.8312	5.06	0.00	188.3025	0.013772	0.267054	0.0125	NA	0.00019	NA	0.02073	NA	0.0030	2.5213	5.4140	0.2154	0.000146
Maximum of Detected	10.00	0.01	6.3000	15.00	0.01	560.0000	0.048000	0.950000	0.0420	0.00000	0.00062	0.00190	0.06400	0.00230	0.0099	6.7000	14.0000	1.1000	0.000570
Median of Detected	3.53	0.00	0.2500	2.50	0.01	89.0000	0.021500	0.026350	0.0200	0.00000	0.00043	0.00190	0.01150	0.00230	0.0026	1.7000	3.6500	0.7400	0.000345
Minimum of Detected	0.37	0.00	0.0570	0.03	0.01	7.5000	0.019000	0.004800	0.0068	0.00000	0.00024	0.00190	0.00320	0.00230	0.0007	0.2200	0.4870	0.3800	0.000230
% of Detected	100	25	92	100	57	100	33	100	100	0	25	8	83	8	83	91	91	100	60
DL											<0.00005	<0.0001			<0.0005				
9/23/2020	3.53	<0.002	<0.1	0.047		129.0	0.020	0.0337	0.038	<0.001	<0.001	<0.002	0.0038	<0.001	0.0058		0.5		
11/24/2020																			
1/15/2021																			
4/1/2021		0.00360	0.063	0.034		9.8	<0.0097	0.01600	0.018	<0.00060	<0.00020	0.0019	<0.0015	<0.0028	<0.0060	0.22			
8/17/2021																			
11/17/2021	0.370	<0.0017	0.14	0.038		7.5	<0.015	0.01500	0.0068	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.0017	0.56	1.2	0.38	0.00033
3/11/2022	7.800	<0.0011	0.25	8		400.0	0.0480	0.00480	0.026	<0.00027	0.00062	<0.0015	0.0640	<0.00017	0.00074	6.7	14.0	0.68	<0.00047
4/5/2022	10.00	<0.0011	0.25	7.5		560	0.023	0.011	0.017	<0.00027	0.00043	<0.0015	0.043	<0.00017	0.0014	5.9	13	0.73	0.00057
8/9/2022	7.00	<0.0017	0.15	2.1	<0.0011	350	<0.015	0.089	0.0084	<0.00062	<0.00020	<0.0025	0.0081	<0.00045	0.0019	2	4.3	0.75	<0.00020
11/1/2022	5.50	<0.0017	0.057	0.079	<0.0011	260	<0.015	0.019	0.010	<0.00062	<0.00020	<0.0025	0.0032	<0.00045	0.00098	<0.200	<0.440	0.85	<0.00020
3/7/2023	1.60	<0.0017	0.55	15	0.006	49	<0.015	0.12	0.035	<0.00062	<0.00020	<0.0025	0.024	<0.00045	0.005	0.64	1.4	0.82	0.00036
4/19/2023	1.90	<0.0017	0.28	2.9	0.0053	26	<0.015	0.039	0.022	<0.00062	<0.00020	<0.0025	0.012	<0.00045	0.0064	1.4	3	0.85	0.00023
9/12/2023	2.10	0.0099	6.3	4.7	0.0089	23	0.019	0.95	0.042	<0.00062	<0.00020	<0.0025	0.011	0.0023	0.0099	5.5	12	1.1	0.00025
12/5/2023	0.63	0.0041	1.3	12	0.009	9.2	<0.015	0.23	0.038	<0.00062	0.00024	<0.0025	0.041	<0.00045	0.0032	4.4	9.4	0.51	0.00055
5/20/2024	5.60	<0.0017	0.34	2	<0.0011	260	<0.015	0.0099	0.017	<0.00062	<0.00020	<0.0025	0.0078	<0.00045	<0.00089	0.9	1.9	0.46	<0.00020

ED Pond 1 Dissolved

SAMPLING DATE	TDS mg/L	Floride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	Si mg/L	SiO2 mg/L	Sr mg/L	Tl mg/L
Sample Size	15	14	14	14	13	11	13	13	13	13	13	13	13	7	13	13	13	13	13	13	13	13	13	13	11	13	10	10
Average of detected	1776	0.8	141.9	1101	<0.2	24.2	306.2	33	0.0534	3.4415	0.0017	0.2034	4.155	0.01	#####	0.03300	0.05179	0.01820	0.0000	0.00056	240.0000	0.02	0.0000	0.0024	2.6400	4.8192	0.7080	0.00042
Std.Dev. Of detected	694	0.5	144.3	384	NA	15.8	129.6	32	0.0400	3.2921	0.0004	0.2776	4.829	0.00	#####	0.01556	0.07738	0.00944	NA	0.00008	NA	0.02	NA	0.0016	2.4245	4.9510	0.2146	0.00015
Maximum of Detected	2800	2.3	410.0	1880	<0.2	60.0	610.0	96	0.1200	10.0000	0.0021	0.7000	14.000	0.01	#####	0.04400	0.23000	0.03400	0.0000	0.00061	240.0000	0.06	0.0000	0.0060	6.6000	14.0000	1.1000	0.00060
Median of Detected	1800	0.6	59.5	1150	<0.2	23.0	310.0	16	0.0380	1.8000	0.0017	0.0820	2.450	0.01	48.0000	0.03300	0.01900	0.01700	0.0000	0.00056	240.0000	0.01	0.0000	0.0017	1.6000	2.3000	0.7300	0.00039
Minimum of Detected	520	0.2	9.1	480	<0.2	5.0	130.0	4	0.0160	0.2600	0.0012	0.0740	0.052	0.00	7.7000	0.02200	0.00320	0.00510	0.0000	0.00050	240.0000	0.00	0.0000	0.0009	0.1900	0.4000	0.3900	0.00029
% of Detected	93	100	100	100	0	100	100	100	38	100	31	38	92	57	100	15	100	100	0	15	8	85	0	92		92	100	40
DL					<0.2															<0.00005	<0.0001			<0.0005				
5/17/2016																												
8/23/2016																												
12/6/2016																												
2/21/2017																												
6/13/2017																												
9/13/2017																												
2/7/2018																												
5/2/2018																												
7/11/2018																												
10/17/2018																												
2/13/2019																												
5/15/2019																												
8/21/2019																												
11/20/2019																												
CIP took over sampling																												
9/23/2020	2390	2.25	136.0	1880																								
11/24/2020	1500	1.10	57.0	1100	<0.2		380	11.0	<0.05	1.40	<0.002	<0.1	0.053		49.0	<0.02	0.0190	0.017	<0.001	<0.001	<0.002	0.0019	<0.001	0.0041		0.6		
1/15/2021	520	0.55	11.00	480	<0.13		130	5.6	<0.034	0.260	<0.0017	<0.047	0.093		9.9	<0.015	0.00830	0.007	<0.00031	<0.00020	<0.00098	0.0024	<0.00045	0.0023		1.3		
4/1/2021	1100	0.96	9.30	700	<0.13	5	240	5.7	0.0360	0.380	<0.0017	<0.047	0.057		9.1	<0.015	0.01400	0.015	<0.00031	<0.00020	240	<0.0015	<0.00045	0.0031	0.19	0.4		
8/17/2021																												
11/17/2021	760	0.67	9.10	550	<0.13	5.6	200	4.0	<0.034	0.390	<0.0017	<0.047	<0.0062		7.7	<0.015	0.01400	0.0051	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.0016	0.44	1.0	0.39	0.0003
3/11/2022	2500	0.22	390.00	1200	<0.13	20	210	96.0	0.1200	7.600	0.00160	0.074	7.1		410.0	0.0440	0.00320	0.026	<0.00027	0.00061	<0.0015	0.0600	<0.00017	0.0009	6.6	14.0	0.63	0.00047
4/5/2022	2800	0.4	410.00	1300	<0.13	26	230	88.0	0.0160	10.000	0.00120	<0.028	7.0		530.0	0.0220	0.00500	0.017	<0.00027	0.0005	<0.0015	0.0410	<0.00017	0.0013	5.8	12.0	0.71	0.0006
8/9/2022	2500	0.83	300.00	1300	<0.13	17	320	57.0	<0.034	7.100	0.00210	<0.047	1.9	<0.0011	350.0	<0.015	0.07900	0.0081	<0.00062	<0.00020	<0.0025	0.0073	<0.00045	0.0018	1.9	4.1	0.75	<0.00020
11/1/2022	2100	0.80	230.00	1300	<0.13	11	330	41.0	<0.034	5.50	<0.0017	<0.047	0.052	<0.0011	260	<0.015	0.019	0.011	<0.00062	<0.00020	<0.0025	0.0031	<0.00045	0.00093	<0.200	<0.440	0.85	<0.00020
3/7/2023	1700	0.36	62.00	1100	<0.13	32	370	14.0	0.057	1.70	<0.0017	0.082	14.0	0.004	48	<0.015	0.041	0.033	<0.00062	<0.00020	<0.0025	0.023	<0.00045	0.0039	0.56	1.2	0.8	0.00029
4/19/2023	1900	0.56	42.00	1300	<0.13	30	460	16.0	<0.034	1.80	<0.0017	<0.047	3.0	0.005	27	<0.015	0.023	0.022	<0.00062	<0.00020	<0.0012	0.012	<0.00045	0.006	1.3	2.9	0.87	<0.00020
9/12/2023	2200	1.20	40.00	1500	<0.13	37	610	13	<0.034	2.30	0.0017	0.083	3.0	0.0056	24	<0.015	0.23	0.026	<0.00062	<0.00020	<0.0012	0.0024	<0.00045	0.0013	4.1	8.7	1.1	<0.00020
12/5/2023	1200.00	0.61	50.00	810	<0.13	60	310	28	0.038	0.71	<0.0017	0.7	12	0.0087	9.2	<0.015	0.21	0.034	<0.00062	<0.00020	<0.0012	0.039	<0.00045	0.0015	4.7	10	0.52	<0.00020
													Sampling frequency Changed to Semi-Annual basis per ODNR Approval															
5/20/2024	1700.00	0.37	240.00	890.00	<0.13	23	190	55	<0.034	5.60	<0.0017	0.078	1.6	<0.0011	260	<0.015	0.0078	0.015	<0.00062	<0.00020	<0.0012	0.0076	<0.00045	<0.00089	0.81	1.7	0.46	<0.00020

ED Pond 2 Total

	Field Measurements																															
SAMPLING DATE	pH	Cond microS/cm	Redox mv	Temperature °C	Flow rate ft^3/sec	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TSS mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	33	32	31	31	28	25	25	29	28	29	30	30	30	29	30	30	30	29	30	30	30	30	30	30	30	30	30	30	23	11	29	29
Average of detected	6	1365.8	232.5	17.4	0.105	33.4	-33.5	5.3	2.2170	10.94	178.8	35.16	0.1509	1.1297	0.00107	3.941	2.172	0.00513	71.2	0.0102	0.00177	0.0261	0.0001212	0.000134	0.000412	0.00543	0.00041	0.00140	13.0	4.8	0.536	0.0008283
Std.Dev. Of detected	1	456.1	218.3	8.3	0.039	23.9	113.5	5.3	6.9512	4.32	51.4	13.83	0.1642	0.8162	0.00215	5.947	1.213	0.00625	56.2	0.0060	0.00261	0.0101	0.0001585	0.000174	0.000967	0.00392	0.00038	0.00239	6.7	3.3	0.127	0.0014496
Maximum of Detected	8	2150.0	1128.0	28.9	0.209	80.0	71.9	25.0	22.0000	19.00	320.0	57.00	0.5690	3.1800	0.00930	30.500	5.200	0.01800	184.0	0.0220	0.00870	0.0520	0.0006200	0.000480	0.004030	0.02000	0.00124	0.01000	22.0	9.9	0.782	0.0064000
Median of Detected	6	1418.0	172.0	18.8	0.103	36.5	9.0	3.7	0.0055	10.60	175.0	38.60	0.0720	0.9600	0.00040	1.470	2.420	0.00250	49.8	0.0081	0.00047	0.0225	0.0000565	0.000040	0.000181	0.00452	0.00026	0.00060	14.0	5.5	0.535	0.0002000
Minimum of Detected	4	343.0	11.9	2.4	0.026	2.0	-347.0	0.4	0.0020	2.80	50.0	15.00	0.0050	0.1212	0.00012	0.210	0.021	0.00002	9.0	0.0030	0.00018	0.0133	0.0000226	0.000010	0.000100	0.00005	0.00002	0.00010	0.6	0.3	0.200	0.0000690
% of Detected	97	100	100	100	46	64	48	83	36	100	100	97	90	100	57	97	100	59	100	63	87	97	47	63	53	97	50	77	100	100	100	66
DL							<2		<0.2															<0.00005	<0.0001			<0.0005				
6/27/2016	3.81	1451	360.2	28.7					<0.005	5.77	143	57.0	0.115	0.125	0.00032	1.8	2.51	<0.0001	25.4	0.0070	0.00046	0.0213	0.000058	<0.00002	0.000100	0.00435	0.00041	0.0001			0.471	<0.00005
7/29/2016	3.68	1436							0.003	5.60	143	56.2	0.037	0.121	<0.002	0.9	2.26	<0.001	31.3	0.0094	<0.009	0.0366	<0.0004	<0.0004	<0.001	0.00460	<0.004	<0.012	7.5		0.503	<0.003
8/23/2016	4.49	1572	214.4	25.7					0.006	9.08	222	50.1	0.062	0.589	0.00131	2.6	2.32	0.00002	39.8	0.0053	0.00047	0.0323	0.000045	0.00004	0.000100	0.00488	0.00124	0.0006			0.623	0.000719
12/6/2016																																
2/21/2017	5.33	1800	383.6	9.4				7.9	22.000	10.6	259	48.4	0.24	0.659	0.00125	11.7	3.07	0.00033	52.3	0.0128	0.00124	0.0222	0.000135	0.00005	0.000323	0.00787	0.00026	0.0004			0.782	0.000343
6/14/2017	4.60	1565	405.0	27.2	0.0924			1.0		7.85	181	44.6	0.199	0.349	0.00088	3.4	2.77	<0.00002	47.2	0.0122	0.00042	0.0226	0.000023	0.00003	0.000117	0.00733	0.00072	0.0002			0.595	0.000105
9/13/2017	3.58	1595	496.2	23.0	0.088			0.8	<0.09	8.12	177	47.1	0.569	0.362	0.00036	5.43	3.01	0.00045	54.7	0.0180	0.00055	0.0225	0.000157	0.00004	0.000190	0.00005	0.00091	0.0006			0.629	0.000069
11/8/2017	3.67	1383	442.5	12.4	0.099			3.5	< 0.09	7.14	143	38.6	0.421	0.313	0.00072	5.15	2.49	0.00020	43.8	0.0165	0.00038	0.0218	0.000158	0.00005	0.000269	0.00776	0.00070	0.0004			0.524	0.000082
2/7/2018	7.80	1710	83.7	2.4	0.088	2	71.9	9.5	< 0.09	7.83	197	45.3	0.0833	0.442	0.00051	30.5	2.94	0.00026	57.8	0.0088	0.00047	0.0153	0.000055	0.00003	0.000163	0.00573	0.00004	0.0006	18.1		0.689	0.000172
5/2/2018	3.80	1660	418.4	27.2	0.11	< 1	33.6	3.8	0.006	7.38	165	47.8	0.0578	0.962	0.00026	5.37	2.44	0.00002	86.9	0.0081	0.00030	0.0169	0.000026	0.00005	0.000134	0.00575	0.000084	0.0003	20.8		0.548	0.000173
7/11/2018	4.10	1680	415.1	28.9	0.099	< 1	25.2	2.0	< 0.002	7.50	159	48.5	0.0232	1.12	0.00037	1.39	2.47	0.00015	90.1	0.0054	0.00026	0.0178	0.000030	0.00004	0.000172	0.00452	0.000061	0.0001	21.5		0.526	0.000094
10/17/2018	5.10	1780	256.8	18.2	0.1034	< 3	20	5.7	0.002	8.31	200	50.8	0.0321	1.17	0.00038	7.61	2.74	< 0.0004	98.8	0.005	0.00029	0.0166	< 0.00002	0.00005	0.0002	0.00375	0.000126	0.0002	18		0.638	< 0.0001
2/13/2019	6.60	1980	172.0	3.4	0.209	< 3	20	5.2	0.012	10.2	161	44.7	0.0777	2.7	0.00041	2.74	2.56	< 0.0004	169	0.0065	0.00046	0.0185	0.00006	0.00003	0.0002	0.00484	0.00007	0.0004	22		0.538	0.0002
5/15/2019	6.50	1810	82.5	23.5	0.11	< 3	10	0.4	0.005	10.7	141	38.2	0.0219	2.57	0.00012	0.469	2.26	< 0.0004	154	0.0066	0.00018	0.0169	0.00005	0.00002	0.0001	0.00429	0.00002	0.0003	19.8		0.47	0.0002
8/21/2019	6.20	2020	36.0	24.4	0.1056	< 5	8	1.3	< 0.002	12.7	196	42.7	0.0500	3.18	< 0.001	0.880	2.53	< 0.002	184	< 0.004	0.00040	0.0189	< 0.0001	< 0.00005	0.00403	0.00305	< 0.0002	0.0006	17.6		0.584	< 0.0005
11/20/2019	6.30	1720	13	9	0.02640	23	< 8	7.2	< 0.002	10.6	173	39.3	0.0050	2.070	0.00020	5.98	3.9	< 0.0004	138.0	0.0030	0.00046	0.0263	< 0.00002	0.00001	0.0002	0.00435	< 0.00005	0.0003	13.6		0.535	< 0.0001
2/19/2020	6.56	1130	56	9	0.1100	8	8	2	0.003	8.31	135	31.5	0.0218	1.320	0.00040	1.47	2.2	< 0.0004	101.0	0.0054	0.00022	0.0213	< 0.00002	0.00003	0.0001	0.0032	< 0.00005	0.0002	14.0		0.456	< 0.0001
4/29/2020	6.63	1400	31	20	0.1210	10	< 8	2.5	0.003	9.78	156	29.5	0.0080	2.190	0.00030	1.21	2.07	< 0.0004	148.0	0.0040	0.00025	0.0189	0.00003	0.00004	0.0002	0.00322	< 0.00005	0.0006	17.1		0.491	0.0002
CIP took over sampling																																
9/23/2020	6.23	1327	12	19	Dipped (No Flow)	21.6	11	<4	<0.2		123	29.1	0.0505	1.540	<0.002	0.21	1.81		93.9	0.0200	<0.005	0.013	<0.001	<0.001	<0.002	0.0066	<0.001	<0.005	5.39			
11/24/2020	7.37	1200	206	5	Dipped (No Flow)	45	-32.6	<4																								
3/9/2021	6.33	343	1128	14.5	Dipped (No Flow)	<2.6	34	<1.0																								
4/1/2021	4.08	2150	143	8.8	Dipped (No Flow)	<2.6	41	<1.0		11	200	46.0	0.3300		<0.0035	8.4	3.9	<0.0049	160.0	<0.034	<0.0041	<0.025	0.00062	0.00048	<0.00063	0.0200	<0.0028	<0.0060		9.6	0.72	0.0064
8/17/2021	7.70	1630	275	25	Dipped (No Flow)	<2.6	<5.0	8	<0.13	11	180	40.0	0.0590	2.100	<0.0017	2.4	3.1	<0.0011	160.0	<0.015	<0.00075	0.026	<0.00062	<0.00020	<0.0025	0.0046	<0.00045	<0.00089	21.0	9.9	0.67	<0.00020
12/10/2021	5.77	415	35	10.55	Dipped (No Flow)	6.10	18.00	13.00	<0.13	2.8	50	15	0.51	0.27	0.0093	8.8	5.2	0.00094	17	0.022	0.00062	0.031	0.00025	0.00036	<0.0015	0.011	0.00078	<0.0015	15	7.2	0.2	0.00018
4/5/2022	3.80	771	240	9.99	Dipped (No Flow)	7.60	<5.0	6.00	<0.13	19	150	20	0.19	0.53	0.0011	1	1.4	0.008	33	0.018	0.0039	0.052	<0.00027	0.00047	<0.0015	0.014	0.00022	0.0011	15	6.7	0.48	<0.00047
7/29/2022	6.60	1250	51	24.93	Dipped (No Flow)	45.00	<5.0	25.00	0.13	18	260	18	0.36	1.10	<0.0017	0.85	0.51	0.018	26	<0.015	0.0087	0.037	<0.00062	<0.00020	<0.0025	0.0019	<0.00045	0.0100	11		0.64	0.0017
8/8/2022	7.64	1150	160	28.16	Dipped (No Flow)	38.00	-17.70	2.40	<0.13	17	270	18	0.35	1.20	<0.0017	0.75	0.099	0.018	26	<0.015	0.0087	0.037	<0.00062	<0.00020	<0.0025	0.0019	0.00047	0.0067	12	5.5	0.65	0.0010
10/27/2022	6.22	1200	163	11.25	Dipped (No Flow)	35.00	-15.90	1.10	<0.13	19	320	16	0.044	1.60	<0.0017	0.22	0.021	0.013	22	<0.015	0.0015	0.034	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.0036	0.57	0.27	0.61	0.0013
3/7/2023	6.57	1050	163	13.14	Dipped (No Flow)	51.00	-45.20	9.50	<0.13	11	170	15	0.085	0.85	<0.0017	0.84	0.72	0.005	15	<0.015	0.0023	0.029	<0.00062	0.00027	<0.0025	0.003	<0.00045	0.0022	5.6	2.6	0.37	0.0012
4/20/2023	6.19	437	121	21.00	Dipped (No Flow)	50.00	-142	2.20	<0.13	14	180	15	0.072	0.96	<0.0017	0.56	0.40	0.0088	17	<0.015	0.0021	0.034	<0.00062	<0.00020	<0.0025	0.0028	<0.00045	0.0012	2.3	1.1	0.44	<0.00020
9/11/2023	5.75	1130	223	20.34	Dipped (No Flow)	80.00	-332	3.90	<0.13	19	190	25	<0.034	0.94	<0.0017	<0.047	0.77	0.009	11	<0.015	0.0078	0.028	<0.00062	0.00046	<0.0025	0.0045	<0.00045	0.0016	5.4	2.5	0.41	0.0014
12/5/2023	8.02	852	138	10.83	Dipped (No Flow)	74.00	-347.00	2.60	<0.13	13	130	20	<0.034	0.59	<0.0017	0.74	0.29	0.0025	9	<0.015	0.00087	0.018	<0.00062	<0.00020	<0.0025	0.0032	<0.00045	<0.00089	4.3	2	0.29	0.0002
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																																
5/21/2024	6.84	1110	283	25.69	Dipped (No Flow)	38.00	-37.40	2.40	<0.13	15	190	27	<0.034	0.84	<0.0017	1	2.4	0.003	23	<0.015	0.0028	0.052	<0.00062	<0.00020	<0.0025	0.0046	<0.00045	<0.00089	12	5.5	0.47	<0.00020

ED Pond 2 Dissolved

SAMPLING DATE	TDS mg/L	Floride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	32	30	31	31	27	29	31	31	31	31	31	31	31	29	31	31	31	31	31	31	31	31	31	31	19		29	29
Average of detected	1054	0.25	122	609	0.454	10.9	170	33	0.1497	1.11	0.0016	3.57	3.40	0.00530	67.94	0.01611	0.00136	0.02585	0.00012	0.00010	0.00028	0.00621	0.00031	0.00128	10.68		0.526	0.000429
Std.Dev. Of detected	311	0.12	81	183	1.124	4.7	65	15	0.1685	0.82	0.0026	5.93	6.88	0.00655	56.84	0.01754	0.00232	0.01035	0.00012	0.00012	0.00037	0.00421	0.00031	0.00241	6.16		0.159	0.000436
Maximum of Detected	1500	0.49	300	850	3.000	19.0	300	59	0.5840	3.23	0.0110	29.20	40.00	0.01900	188.00	0.08310	0.00910	0.05300	0.00041	0.00041	0.00170	0.01800	0.00096	0.01000	22.00		0.780	0.001600
Median of Detected	1120	0.24	121	656	0.004	10.0	173	36	0.0790	0.94	0.0005	1.17	2.48	0.00285	46.10	0.00890	0.00040	0.02330	0.00006	0.00004	0.00020	0.00469	0.00021	0.00045	11.00		0.530	0.000200
Minimum of Detected	220	0.05	12	130	0.001	1.1	28	7	0.0100	0.02	0.0001	0.04	0.02	0.00004	5.94	0.00300	0.00012	0.00680	0.00002	0.00001	0.00010	0.00004	0.00003	0.00010	0.45		0.101	0.000075
% of Detected	94	97	100	100	26	100	100	100	68	100	65	87	100	55	100	68	81	100	48	58	55	84	39	71	100		100	59
DL					<0.2															<0.00005	<0.0001			<0.0005				
6/27/2016	993	0.10	77.7	608		6.33	148	59.1	0.102	0.130	0.0008	0.834	2.58	<0.0001	27.2	0.0172	0.0003	0.0233	0.000065	0.00004	0.0002	0.00689	0.000362	0.0002			0.484	<0.00005
7/29/2016	1162		76.8	662	0.002	1.0643	27.7514	10.9	<0.030	0.025	<0.002	0.12	0.4594	<0.001	5.9	0.0074	<0.009	0.0068	<0.0004	<0.0004	<0.001	<0.001	<0.004	<0.012	1.5		0.1008	<0.003
8/23/2016	1200	0.32	95.1	749		9.73	238	53.3	0.065	0.619	0.0005	0.679	2.44	0.00037	42.7	0.0098	0.0004	0.0351	0.000049	0.00006	0.0001	0.00552	0.000088	0.0005	18.9		0.669	0.0010
12/6/2016																												
2/21/2017	1380	0.22	128	849	3.00	10.2	255	47.2	0.219	0.589	0.0015	10.6	3.01	0.0003	50.9	0.0221	0.0005	0.0222	0.000126	0.00009	0.000295	0.00802	0.000227	0.0003			0.76	0.0004
6/14/2017	1080	0.1	121	751	0.0010	7.74	180	43.6	0.195	0.333	0.0061	2.78	2.70	0.00006	46.1	0.0831	0.0004	0.0249	0.000025	0.00013	0.000144	0.00768	0.000698	0.0003			0.594	0.0001
9/13/2017	1080	0	135	723	<0.09	7.77	171	45	0.584	0.319	0.000	5.070	2.92	<0.00002	53.3	0.021	0.00051	0.0232	0.000162	0.0000	0.0002	0.000044	0.000960	0.0005	9.94		0.61	0.0001
11/8/2017					< 0.09	7	144	38.8	0.4090	0.247	0.00077	4.74	2.48	0.00006	44.3	0.0181	0.00034	0.0219	0.000141	0.00005	0.000289	0.00808	0.000696	0.0004			0.53	0.000108
2/7/2018	1200	0.2	159	741	< 0.09	7.95	200	45.8	0.0790	0.450	0.00051	29.2	2.97	0.00010	58.2	0.0089	0.00040	0.0155	0.000055	0.00003	0.000129	0.00594	0.000031	0.0006			0.695	0.000183
5/2/2018	1140	0.19	181	701	0.007	7.78	171	51.5	0.0510	0.941	0.00028	3.55	2.49	0.00004	88.6	0.0082	0.00020	0.0165	0.000028	0.00004	0.000130	0.00577	0.000075	0.0003			0.576	0.000161
7/11/2018	1180	0.21	205	656	< 0.002	7.13	155	49.4	0.0246	1.11	0.00025	0.639	2.42	0.00006	88.1	0.0054	0.00023	0.0178	0.000031	0.00002	0.000165	0.00451	0.000053	0.0001			0.512	0.000092
10/17/2018	1250	0.3	194	718		8.93	204	51.4	0.0159	1.19	0.00025	6.59	2.81	< 0.0004	100	0.005	0.00027	0.0168	< 0.00002	0.00003	0.0001	0.00396	< 0.00002	0.0002			0.649	< 0.0001
2/13/2019	1410	0.16	250	667		9.82	157	43.7	0.0553	2.63	0.00038	1.57	2.44	< 0.0004	166	0.0064	0.00018	0.0173	0.00006	0.00003	0.0002	0.00467	0.00004	0.0003			0.522	0.0002
5/15/2019	1320	0.24	214	631	0.004	10	141	36.2	0.0195	2.45	0.00013	0.082	2.21	< 0.0004	148	0.0058	0.00012	0.0172	0.00005	0.00002	0.0001	0.00447	< 0.00002	0.0003			0.456	0.0002
8/21/2019	1500	0.37	234	757	< 0.002	13.3	202	43.4	0.080	3.23	< 0.001	0.355	2.61	< 0.002	188	0.004	0.0004	0.0197	< 0.0001	< 0.00005	0.0003	0.00322	< 0.0002	0.0006			0.599	< 0.0005
11/20/2019	1300	0.28	191	640	< 0.002	10.7	173	39	< 0.005	2.08	0.0003	5.67	3.84	< 0.0004	138	0.003	0.00043	0.0267	< 0.00002	0.00001	0.0002	0.00446	< 0.00005	0.0002	13.6		0.532	< 0.0001
2/19/2020	989	0.26	136.00	492	< 0.002	8.23	134	30.9	0.01	1.33	0.0004	1.17	2.2	< 0.0004	98.6	0.0067	0.00018	0.0216	< 0.00002	0.00003	0.0002	0.00328	< 0.00005	0.0002	14		0.448	< 0.0001
4/29/2020	1210	0.25	179.00	613	0.002	9.55	153	29.3	0.02	2.19	0.0003	0.04	2.09	< 0.0004	149	0.0052	0.00021	0.0188	0.00003	0.00004	0.0002	0.00384	< 0.00005	0.0007			0.492	0.0002
CIP took over sampling																												
9/23/2020	927	0.285	147	549																								
11/24/2020	810	<0.5	110	370	<0.2		110	27	<0.05	1.30	<0.002	<0.1	3.2		86	<0.02	<0.005	0.013	<0.001	<0.001	<0.002	<0.002	<0.001	<0.005	13			
3/9/2021	220	0.051	12	130	<0.13		33	7.2	0.49	0.21	<0.0021	7.2	3		11	0.03	<0.0075	0.035	0.00041	0.00036	<0.0098	0.018	<0.00045	<0.00089	11			
4/1/2021	1400	0.18	300	840	<0.13	12	190	46	0.3	2.00	<0.0017	8.6	3.9	<0.0049	160	0.028	<0.00075	0.033	0.00033	<0.00020	0.0017	0.017	<0.00045	<0.00089	22	10	0.78	<0.0027
8/17/2021	1500	0.27	250	730	<0.13	11	180	40	0.055	2.10	0.0024	1.5	40	<0.0011	160	<0.015	<0.00075	0.026	<0.00062	<0.00020	<0.0025	0.0048	<0.00045	<0.00089	20	9.5	0.65	<0.00020
12/10/2021	360	0.099	25	150	<0.13	2	32	11	0.26	0.17	0.011	4.2	3.4	<0.00061	11	0.024	0.00032	0.028	0.0002	0.00029	<0.0015	0.01	0.00023	<0.0015	13	6.2	0.13	<0.00015
4/5/2022	760	0.14	62	440	<0.13	19	150	20	0.019	0.51	0.0016	0.33	1.3	0.0076	33	0.019	0.0017	0.052	<0.00027	0.00041	<0.0015	0.013	0.0002	0.00077	14	6.7	0.48	0.0006
7/29/2022	1100	0.47	51	750	0.16	18	270	18	<0.034	1.20	0.0026	<0.047	0.41	0.019	27	<0.015	0.0059	0.034	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.01	11		0.66	0.0016
8/8/2022	1200	0.49	51	760	<0.13	18	290	19	<0.034	1.30	0.0021	<0.047	0.027	0.019	27	<0.015	0.0066	0.036	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.0066	11	5.4	0.69	0.00098
10/27/2022	1100	0.49	43	850	<0.13	19	300	16	<0.034	1.50	<0.0017	<0.047	0.017	0.012	21	<0.015	0.00075	0.034	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.003	0.45	0.21	0.59	0.00094
3/7/2023	780	0.14	29	470	<0.13	11	180	16	<0.034	0.87	<0.0017	0.11	0.78	0.0040	16	<0.015	<0.00075	0.030	<0.00062	<0.00020	<0.0025	0.0033	<0.00045	<0.00089	5.3	2.5	0.41	0.00024
4/20/2023	830	0.30	35	520	<0.13	14	180	15	<0.034	0.94	<0.0017	0.15	0.38	0.0087	17	<0.015	0.0014	0.034	<0.00062	<0.00020	<0.0012	0.0024	<0.00045	0.0012	2	0.95	0.44	<0.00020
9/11/2023	800	0.41	32	490	<0.13	19	190	26	0.09	0.97	<0.0017	0.34	1.0	0.0078	12	<0.015	0.0091	0.03	<0.00062	<0.00020	<0.0012	0.0046	<0.00045	0.00091	5.8	2.7	0.42	0.00028
12/5/2023	620	0.32	25	350	<0.13	14	130	21	<0.034	0.62	<0.0017	0.068	2.9	0.0027	9.3	<0.015	0.00075	0.018	<0.00062	<0.00020	<0.0012	0.0032	<0.00045	<0.00089	4.4	2	0.3	<0.00020
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval																											
5/21/2024	890.00	0.24	45.00	530.00	<0.13	15	190	27	<0.034	0.86	<0.0017	0.32	2.4	0.003	23	<0.015	0.0025	0.053	<0.00062	<0.00020	<0.0012	0.0047	<0.00045	<0.00089	12	5.5	0.48	<0.00020

ED Pond 3 Total

	Field Measurements																															
SAMPLING DATE	pH	Cond microS/cm	Redox mv	Temperature °C	Flow rate ft^3/sec	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TSS mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	24	23	23	23	27	22	22	24	19	21	22	22	22	21	22	22	22	21	22	22	22	22	22	22	21	22	22	21	20	12	21	21
Average of detected	7	2072.8	138.4	16.4	0.017	37.0	-28.3	31	0.0268	19.83	378.5	59.28	1.0464	2.0990	0.00188	0.416	3.457	0.04394	62.2	0.0403	0.01510	0.0255	0.000633	0.000470	0.000974	0.0525	0.00049	0.02285	7.3	4.1	0.821	0.0017213
Std.Dev. Of detected	1	798.0	74.6	8.7	0.011	25.7	99.8	60	0.0243	16.18	157.9	35.37	1.7083	1.7430	0.00087	0.474	4.477	0.04828	76.6	0.0478	0.01614	0.0091	0.000824	0.000434	0.001061	0.0751	0.00057	0.02262	3.4	2.2	0.369	0.0019743
Maximum of Detected	8	3550.0	278.9	31.6	0.033	80.0	89.0	260	0.0640	53.00	650.0	169.00	7.4300	5.1000	0.00328	1.800	18.800	0.19000	270.0	0.1620	0.05250	0.0520	0.002220	0.001340	0.003200	0.2820	0.00182	0.08500	18.0	8.5	1.510	0.0075000
Median of Detected	7	2150.0	139.1	17.8	0.014	34.4	6.0	6	0.0245	12.00	388.5	55.00	0.2650	1.6600	0.00164	0.203	2.000	0.01800	29.1	0.0186	0.00630	0.0259	0.000178	0.000340	0.000407	0.0265	0.00022	0.01420	6.6	3.3	0.751	0.0009530
Minimum of Detected	5	24.2	-6.0	2.2	0.007	4.1	-320.0	1	0.0020	3.49	100.0	14.00	0.0570	0.2760	0.00058	0.050	0.040	0.00260	3.2	0.0030	0.00097	0.0074	0.000014	0.000020	0.000200	0.0025	0.00007	0.00180	2.9	1.3	0.260	0.0002400
% of Detected	96	100	96	100	22	73	41	92	32	100	100	95	100	100	64	100	100	81	100	64	95	100	55	55	48	100	68	81	100	100	100	76
DL							<2		<0.2															<0.00005	<0.0001			<0.0005				
8/23/2016																																
12/6/2016																																
2/21/2017																																
6/14/2017	8.20	1648	278.90	31.6	0.033			6		7.11	259	43.2	0.0914	1.23	0.00158	0.158	0.54	0.0161	26.8	0.0044	0.00228	0.0138	0.000014	0.00008	0.000313	0.00716	0.00015	0.0051			0.393	0.000415
9/13/2017																																
11/8/2017	8.09	2474	139.10	13.5	0.011			4.2		12.3	482	29.1	0.1390	4.840	0.00120	0.119	0.25	0.0650	60.2	0.0030	0.03470	0.0273	0.000040	0.00003	0.001330	0.0071	0.00014	0.023	4.38		0.954	0.000806
2/7/2018	7.30	1899	94.30	2.2	0.0176	12.4	9	3.3	< 0.09	11.9	294	64.0	0.2430	1.050	0.00103	0.147	4.08	0.0159	53.6	0.0212	0.00452	0.0147	0.000115	0.00038	0.000264	0.0525	0.000075	0.0064	6.47		0.725	0.000409
5/2/2018	6.90	2150	215.70	26.3	0.0066	8.96	6	10.7	0.021	7.56	422	79.3	0.422	1.17	0.00128	0.196	4.62	0.0180	29.9	0.0120	0.00496	0.0227	0.000113	0.00030	0.000402	0.0498	0.000184	0.0105	4.43		0.751	0.000355
7/11/2018	7.60	2590	67.00	29.6	dipped	20.3	< 5	2.5	0.028	7.44	573	65.7	0.0572	1.66	0.00058	0.067	0.304	0.0149	28.2	< 0.0008	0.0387	0.0267	0.00002	0.00002	0.000412	0.00515	0.000067	0.0066	5.11		1.04	0.000316
10/17/2018	7.20	2650	98.00	17.8	0.0088	35.8	< 8	4.7	0.064	11.6	521	50.9	0.2010	4.920	0.00122	0.303	1.38	0.0528	60.9	0.0040	0.05250	0.035	0.00010	0.00011	0.000878	0.0167	0.000441	0.0324	5.96		1.51	0.0007
2/13/2019	7.00	1300	46.80	3.5	0.0264	9	< 8	123	0.044	3.49	233	37.3	1.8300	0.276	0.00328	1.26	3.14	0.003	9.25	0.0530	0.00868	0.0229	0.000561	0.00062	0.0032	0.0715	0.00182	0.0066	7.16		0.534	0.0004
5/15/2019					No Flow																											
8/21/2019					No Flow																											
11/20/2019					No Flow																											
2/19/2020					No Flow	< 5	30	2	0.002	4.15	249	85.5	1.6400	0.339	0.00120	0.05	7.88	< 0.0004	8.62	0.0655	0.00148	0.0182	0.000634	0.00069	0.0002	0.1150	0.00007	0.0039	7.44		0.524	< 0.0001
4/29/2020	5.56	1870	112	20	dipped	< 5	89	1	0.002	3.83	229	124.0	7.4300	0.304	0.00276	0.126	12	< 0.0004	8.81	0.1620	0.00348	0.0229	0.00222	0.00134	0.000244	0.2820	0.00010	0.0142	10.9		0.491	< 0.0001
CIP took over sampling																																
9/23/2020	5.43	24.2	164.50	20.87	Dipped (No Flow)	<5	87.4	13	<0.2		355	169.0	3.7200	0.460	0.00240	0.112	18.8		10.2	0.1170	0.00372	0.025	0.00214	0.000744		0.2480	0.00056		5.92			
11/24/2020	7.43	1390	187.00	6.32	Dipped (No Flow)	4.1	24	6																								
2/8/2021	7.72	2160	14	3.47	Dipped (No Flow)	<2.6	30	<2.2																								
4/1/2021	4.57	2350	226	10	Dipped (No Flow)	<2.6	28	<1.0		11	220	69.0	1.6000		<0.0035	0.32	5.4	<0.0049	170.0	0.0590	<0.0041	0.018	0.00140	0.0011	<0.00063	0.0820	<0.0028	<0.0060		8.0	0.67	0.0075
8/20/2021	5.78	1820	222	25	Dipped (No Flow)	<2.6	<5.0	4	<0.13	11	220	44.0	0.3200	2.200	<0.0017	0.57	3.7	<0.0011	170.0	<0.015	0.00120	0.019	<0.00062	<0.00020	<0.0025	0.0120	<0.00045	<0.00089	18.0	8.5	0.75	<0.00020
12/13/2021	5.25	1010	-6	12.61	Dipped (No Flow)	18	<5.0	100	<0.13	13	490	35.0	0.8800	2.700	0.00210	1.2	2.2	0.015	58.0	0.0310	0.01700	0.028	0.00024	<0.00022	<0.0015	0.0290	0.00069	0.013	6.7	3.1	1	0.0011
3/17/2022	7.61	3210	55	23.24	Dipped (No Flow)	72	-42.4	33	<0.13	53	440	55.0	0.2600	5.100	<0.0011	0.21	1.7	0.043	270.0	0.0069	0.02300	0.031	<0.00027	<0.00022	<0.0015	0.0240	0.00022	0.016	8.0	3.7	1.1	0.0021
4/5/2022	7.15	3550	213	8.53	dipped	60	-55	6.3	<0.13	44	510	65.0	0.1900	4.100	<0.0011	0.076	1.8	0.033	230.0	0.0097	0.02000	0.030	<0.00027	<0.00022	<0.0015	0.0340	<0.0017	0.02	7.3	3.4	1.1	0.0012
8/9/2022	6.67	3070	178	25.92	Dipped (No Flow)	53	-21.90	260	<0.13	46	650	42	2.4	4.40	0.0032	1.8	0.28	0.098	77.0	<0.015	0.044	0.052	<0.00062	<0.00020	<0.0025	0.0046	0.0018	0.047	13	6	1.4	0.0036
10/27/2022	6.83	2600	204	12.21	Dipped (No Flow)	66.00	-43.50	7.40	<0.13	49	620	36	0.25	4.00	<0.0017	0.15	0.04	0.190	42.0	<0.015	0.033	0.034	<0.00062	<0.00020	<0.0025	0.0025	<0.00045	0.085	2.9	1.3	1.4	0.0044
3/7/2023	6.22	2380	115	11.92	Dipped(No Flow)	15.00	26.00	39.00	<0.13	27	470	55	0.7	1.80	<0.0017	0.39	3.6	0.092	17	0.016	0.008	0.027	<0.00062	0.00023	<0.0025	0.048	0.0005	0.044	6.4	3	0.95	0.0016
4/19/2023	7.17	2720	148	18.53	Dipped (No Flow)	33.00	-123.00	3.60	<0.13	31	530	71	0.21	2.00	<0.0017	0.08	2.2	0.067	19	<0.015	0.0063	0.025	<0.00062	<0.00020	<0.0025	0.046	<0.00045	0.053	5.6	2.6	1	0.0024
9/12/2023	5.75	1600	98	19.41	Dipped (No Flow)	66.00	-165.00	22.00	<0.13	18	260	33	0.27	0.73	0.0017	0.55	0.23	0.0087	5	<0.015	0.0046	0.029	<0.00062	<0.00020	<0.0025	0.0044	<0.00045	0.0018	4.7	2.2	0.39	<0.00020
12/5/2023	8.35	1090	113	9.91	Dipped (No Flow)	80.00	-320.00	6.60	<0.13	32	200	21	0.11	0.33	0.0028	0.27	0.42	0.012	3.2	<0.015	0.004	0.0074	<0.00062	<0.00020	0.0025	0.0065	<0.00045	<0.0014	8.1	3.8	0.3	0.00024
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval																															
6/6/2024	7.10	2120	200	24	Dipped (No Flow)	38.00	-39.80	28.00	<0.13	12	100	14	0.057	0.47	<0.0017	1	1.5	0.0026	11	<0.015	0.00097	0.032	<0.00062	<0.00020	<0.0025	0.0071	0.00053	<0.00089	6.9	3.2	0.26	<0.00020

ED Pond 3 Dissolved

SAMPLING DATE	TDS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L
Sample Size	24	23	23	23	21	21	23	23	23	23	23	23	23	21	23
Average of detected	2017	1.1	94	1243	0.0	18.7	353	53	0.60	2.26	0.0018	0.46	2.85	0.0447	69.29
Std.Dev. Of detected	999	0.9	99	493	0.0	15.6	168	25	1.66	1.74	0.0009	1.02	2.97	0.0514	77.40
Maximum of Detected	5400	4.0	330	1900	0.0	53.0	650	125	7.39	5.24	0.0032	3.50	12.30	0.2000	270.00
Median of Detected	1990	0.8	42	1300	0.0	12.1	278	48	0.08	1.80	0.0017	0.04	2.35	0.0174	35.80
Minimum of Detected	520	0.2	7	310	0.0	3.5	100	14	0.03	0.27	0.0008	0.00	0.02	0.0020	3.10
% of Detected	92	100	100	100	14	95	96	91	87	100	70	52	96	76	96
DL					<0.2										
8/23/2016															
12/6/2016															
2/21/2017															
6/14/2017	1460	0.74	38.9	985	0.007	7.39	274	45.8	0.0263	1.28	0.00266	0.014	0.581	0.0161	28.6
9/13/2017															
11/8/2017					< 0.09	12.4	494	29.8	0.0790	4.88	0.00094	0.028	0.253	0.0616	60.7
2/7/2018	1660	0.79	99.6	1010	< 0.09	11.4	281	60.7	0.0802	1.02	0.00099	0.011	3.89	0.0160	50.3
5/2/2018	1980	1.54	42.0	1430	0.003	7.09	398	78.7	0.0807	1.00	0.00119	0.003	4.34	0.0186	28.2
7/11/2018	2500	2.62	40.1	1820	0.011	6.96	543	62.6	0.0339	1.58	0.00079	0.005	0.223	0.0146	26.5
10/17/2018	2460	3.96	77.20	1640		12.1	555	54.4	0.0340	5.240	0.00075	0.008	1.42	0.0551	64.5
2/13/2019	1140	0.77	13.20	802		3.48	219	39.0	0.1260	0.274	0.00165	< 0.003	3.23	0.002	9.9
5/15/2019															
8/21/2019															
11/20/2019															
2/19/2020	1570	1.73	8.74	1120	< 0.002	4.29	255	86.0	1.3600	0.343	0.00108	< 0.02	7.97	< 0.0004	9.38
4/29/2020	2120	2.72	7.37	1530	< 0.002	3.85	228	125.0	7.3900	0.300	0.00234	0.116	12.3	< 0.0004	9.06
CIP took over sampling															
9/23/2020	2260	1.99	6.61	1890											
11/24/2020	950	0.26	120.00	540	<0.2		140	36.0	0.0710	1.200	<0.002	<0.1	2.8		85.0
2/8/2021	1700	0.27	330.00	880	<0.13		190	48.0	0.1000	3.300	<0.0017	3.5	3.7		220.0
4/1/2021	1800	0.81	270.00	1000	<0.13	12	210	70.0	1.6000	2.300	<0.0017	0.32	6.1	<0.0049	180.0
8/20/2021	1700	0.52	260.00	900	<0.13	11	230	46.0	0.3400	2.300	0.00320	0.21	3.9	<0.0011	180.0
12/13/2021	2100	1.20	75.00	1300	<0.13	16	480	41.0	0.2800	3.700	0.00087	1.3	2.6	0.0130	130.0
3/17/2022	2800	0.54	250.00	1500	<0.13	53	430	57.0	0.0630	5.100	0.00170	<0.028	1.7	0.0430	270.0
4/5/2022	2800	0.88	220.00	1800	<0.13	<0.160	<0.130	<0.050	<0.016	4.100	<0.0011	<0.028	<0.0013	<0.00061	<0.180
8/9/2022	5400	1.40	91.00	1900	<0.13	45	640	41	0.1	4.70	0.0028	<0.047	0.03	0.0950	75
10/27/2022	2600	0.89	78.00	1900	<0.13	51	650	37	0.035	4.10	0.0029	<0.047	0.022	0.2000	43
3/7/2023	2000	0.52	30.00	1400	<0.13	26	460	53	0.035	1.80	<0.0017	<0.047	3.5	0.0900	17
4/19/2023	2500	0.90	36.00	1700	<0.13	31	530	70	0.061	2.00	<0.0017	<0.047	2.1	0.0660	18
9/12/2023	1000	0.61	15.00	760	<0.13	18	260	34	<0.034	0.72	<0.0017	<0.047	0.2	0.0091	5.1
12/5/2023	820	0.43	24.00	470	<0.13	31	190	20	<0.034	0.31	0.0024	<0.047	0.35	0.0120	3.1
Sampling frequency Changed to Semi-Annual basis per ODNR Approval															
6/6/2024	520.00	0.23	25.00	310.00	<0.13	12	100	14	0.057	0.48	0.0023	0.057	1.5	0.0038	11

SAMPLING DATE	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	23	22	23	23	23	23	23	23	23	15	12	21	21
Average of detected	0.0320	0.0122	0.0226	0.00040	0.0004	0.0006	0.0394	0.00007	0.0211	8.91	3.62	0.82	0.001134
Std.Dev. Of detected	0.0456	0.0132	0.0073	0.00061	0.0004	0.0008	0.0597	0.00007	0.0235	5.83	2.41	0.38	0.001245
Maximum of Detected	0.1580	0.0348	0.0352	0.00219	0.0013	0.0024	0.2720	0.00020	0.0860	21.00	8.90	1.61	0.004500
Median of Detected	0.0111	0.0039	0.0229	0.00015	0.0003	0.0003	0.0159	0.00004	0.0100	7.00	2.85	0.75	0.000700
Minimum of Detected	0.0010	0.0009	0.0069	0.00001	0.0000	0.0002	0.0017	0.00001	0.0013	2.30	1.10	0.26	0.000100
% of Detected	52	86	96	52	48	48	96	39	74	100	100	95	71
DL					<0.00005	<0.0001			<0.0005				
8/23/2016													
12/6/2016													
2/21/2017													
6/14/2017	0.0035	0.00216	0.0139	0.0000139	0.00006	0.000258	0.00703	0.000035	0.0049			0.418	0.000400
9/13/2017													
11/8/2017	0.0020	0.03080	0.0258	0.000020	0.00001	0.000978	0.00642	0.000030	0.0223			0.983	0.000757
2/7/2018	0.0213	0.00319	0.0147	0.000081	0.00041	0.000189	0.0527	0.000007	0.0061			0.691	0.000392
5/2/2018	0.0111	0.00363	0.0235	0.000042	0.00034	0.000221	0.0486	0.00001	0.0092			0.722	0.000365
7/11/2018	0.001	0.0348	0.0263	0.00001	0.00003	0.000207	0.00480	0.00001	0.0066			0.981	0.000300
10/17/2018	0.0030	0.02990	0.0352	0.00005	0.00008	0.0002	0.0168	0.00009	0.0312			1.61	0.0007
2/13/2019	0.0487	0.00097	0.017	0.00022	0.00057	0.0004	0.0732	< 0.00004	0.0041			0.518	0.0002
5/15/2019													
8/21/2019													
11/20/2019													
2/19/2020	0.0635	0.00126	0.0179	0.00062	0.00065	0.0002	0.1120	0.00020	0.0036	7.4		0.526	< 0.0001
4/29/2020	0.1580	0.00343	0.023	0.00219	0.00132	0.000256	0.2720	0.00010	0.0144			0.491	0.0001
9/23/2020													
11/24/2020	<0.02	<0.005	0.015	0.00037	<0.001	<0.002	0.0150	<0.001	<0.005	12			
2/8/2021	<0.015	<0.00075	0.018	0.00050	0.0002	<0.00098	0.0099	<0.00045	<0.00089	21.0			
4/1/2021	0.0550		0.017	0.00063	0.00032	0.0018	0.0750	<0.00045	<0.00089	18.0	8.2	0.71	<0.0027
8/20/2021	<0.015	0.00087	0.020	<0.00062	<0.00020	<0.0025	0.0120	<0.00045	<0.00089	19.0	8.9	0.78	<0.00020
12/13/2021	0.0110	0.01700	0.022	<0.0018	<0.00022	<0.0015	0.0250	0.00015	0.010	6.3	3.0	1.1	0.00088
3/17/2022	0.0062	0.02000	0.030	<0.00027	<0.00022	<0.0015	0.0240	<0.00017	0.016	7.5	3.5	1.1	0.00200
4/5/2022	<0.0029	<0.00028	<0.0031	<0.00027	<0.00022	<0.0015	<0.00052	<0.00017	<0.00074	7	3.3	<0.0017	<0.00047
8/9/2022	<0.015	0.033	0.034	<0.00062	<0.00020	<0.0025	0.0017	<0.00045	0.047	5.9	2.7	1.4	0.0029
10/27/2022	<0.015	0.032	0.033	<0.00062	<0.00020	<0.0025	0.0023	<0.00045	0.086	2.3	1.1	1.4	0.0045
3/7/2023	<0.015	0.0049	0.023	<0.00062	<0.00020	<0.0025	0.047	<0.00045	0.042	4.9	2.3	0.92	0.0012
4/19/2023	<0.015	0.0055	0.024	<0.00062	<0.00020	<0.0012	0.046	<0.00045	0.053	5.3	2.5	1.0	0.0021
9/12/2023	<0.015	0.0037	0.028	<0.00062	<0.00020	<0.0012	0.0039	<0.00045	0.0017	3.8	1.8	0.4	<0.00020
12/5/2023	<0.15	0.0039	0.0069	<0.00062	<0.00020	0.0024	0.0061	<0.00045	0.0013	7.6	3.5	0.29	0.00022
6/6/2024	<0.015	0.0011	0.029	<0.00062	<0.00020	<0.0012	0.0063	<0.00045	<0.00089	5.6	2.6	0.26	<0.00020

OW-1 Total

SAMPLING DATE	pH	Cond microS/cm	Redox mv	Temperature °C	Flow rate ft^3/sec	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TSS mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L
	Field Measurements														
Sample Size	32	31	31	31	30	30	30	29	27	28	29	29	29	28	29
Average of detected	6.01	1411	203	17.3	0.092	33.5	-22.7	5	1.2269	12.64	186.4	34.90	0.1292	1.1860	0.00070
Std.Dev. Of detected	1.46	454	154	8.4	0.035	24.9	110.1	6	3.6649	7.27	47.9	13.58	0.1550	0.8022	0.00060
Maximum of Detected	9.73	2270	467	29.5	0.187	77.0	75.6	31	11.0000	43.00	310.0	59.80	0.5800	3.2100	0.00200
Median of Detected	6.40	1420	177	18.0	0.088	31.1	8.0	3	0.0030	11.00	180.0	34.90	0.0520	1.0450	0.00043
Minimum of Detected	3.51	0	-24	3.0	0.022	0.5	-491.0	1	0.0020	6.10	110.0	15.00	0.0070	0.1260	0.00016
% of Detected	97	97	94	100	43	67	50	86	33	100	100	97	83	100	59
DL							<2		<0.2						
6/27/2016	3.62	1419	369.6	29.0		<2	27.1		<0.005	6.10	145	59.8	0.0562	0.126	0.00025
8/23/2016	6.04	1099	29.4	26.9	no flow	2.4	5.66		0.002	6.47	126	45.3	0.0477	0.163	0.00016
12/6/2016					no flow										
2/21/2017	5.32	1774	420.3	9.3		0.5	40.3	2	11.000	9.99	248	47.4	0.3100	0.597	0.00144
6/14/2017	5.00	1582	450.7	26.8	0.0836	0.5	44.3	2		7.94	183	45.3	0.1230	0.340	0.00078
9/13/2017	3.80	1592	466.9	22.7	0.0792	<1	26.1	2.3	<0.09	8.29	179	47.2	0.1310	0.394	0.00039
11/8/2017	3.65	1617	419.1	12.3	0.088			2	< 0.09	8.02	175	46.8	0.1450	0.314	0.00042
2/7/2018	7.90	1814	83.5	3.0	0.077	28.2	75.6	7.8	< 0.09	8.29	214	47.8	0.0351	0.504	0.00068
5/2/2018	3.90	1680	395.9	27.3	0.099	< 1	26	4.5	0.008	8.25	183	52.6	0.0452	1.09	0.00026
7/11/2018	4.00	1690	386.9	29.5	0.088	< 1	29.4	1	0.002	7.54	155	48.2	0.0219	1.15	0.00023
10/17/2018	5.00	1800	268.3	18.0	0.0946	< 3	20	7.8	0.002	8.09	195	48.7	0.0169	1.12	0.00046
2/13/2019	6.90	2100	138.7	3.9	0.187	< 3	20	8	0.014	10.7	171	45.8	0.0872	2.82	0.00043
5/15/2019	6.40	1840	87.4	23.8	0.0924	< 3	9	2	0.008	11.1	148	40.1	0.0247	2.71	0.00017
8/21/2019	6.20	2050	32.0	24.6	0.088	6	10	1.6	< 0.002	12.9	200	43.1	0.030	3.21	< 0.001
11/20/2019	6.2	1740	21.10	9.2	0.022	27.2	< 8	4.5	< 0.002	11.2	173	37.8	< 0.005	2.08	< 0.0002
2/19/2020	6.42	1130	67	7	0.0968	8	8	2	0.003	8.25	133	30.7	0.0294	1.330	0.00060
4/29/2020	6.47	1430	40	20	0.0990	10	< 8	2.3	0.003	9.87	157	29.7	0.0070	2.190	0.00030
CIP took over sampling															
9/23/2020	6.47	1402	-14	18.00	Dipped (no Flow)	26.9	-10.1	<4	<0.2		130	29.3	<0.05	1.670	<0.002
11/24/2020	7.04	1020	-24	4.46	Dipped (no Flow)	72	-39	15							
3/9/2021	4.66	848	220	15.18	Dipped (no Flow)	<2.6	49	3							
4/1/2021	3.51	2270	380	9.27	Dipped (no Flow)	<2.6	60	<1.0		11	200	48.0	0.3300		<0.0035
8/17/2021	6.83	1300	298	24.33	Dipped (no Flow)	<2.6	<5.0	31	<0.13	12	140	32.0	0.4800	1.500	<0.0017
12/13/2021	6.90	1210	317	13	Dipped (no Flow)	34	-13.9	3	<0.13	13	190	18.0	0.5800	1.000	0.00140
3/3/2022	7.52	1580	78	5.35	Dipped (no Flow)	21	-36.7	5	<0.13	43	240	21.0	0.0370	0.950	0.00200
6/30/2022	6.98	0	128	21	Dipped (no Flow)	52.00	-34.00	6.60	<0.13	22	270	19.0	0.2900	1.100	<0.0017
08/08/022	7.42	1150	177	27.94	Dipped (no Flow)	38.00	-10.90	3.90	<0.13	19	290	20	0.12	1.30	<0.0017
10/27/2022	6.55	1420	176	10.64	Dipped (no Flow)	38.00	-22.20	<1.0	<0.13	19	310	16	<0.034	1.50	<0.0017
3/7/2023	6.31	1060	167	14.05	Dipped (no Flow)	57.00	-22.30	2.30	<0.13	11	180	16	<0.034	0.87	<0.0017
4/20/2023	6.92	1100	182	22.28	Dipped (no Flow)	62.00	-149.00	1.90	<0.13	14	180	15	0.039	0.92	0.0019
9/12/2023	5.69	1150	224	20	Dipped (no Flow)	77.00	-200.00	2.00	<0.13	20	190	27	0.078	0.91	<0.0017
12/5/2023	9.73	763	35	11.27	Dipped (no Flow)	69.00	-491.00	2.20	<0.13	12	110	18	<0.034	0.52	<0.0017
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval														
5/21/2024	6.82	1120	276	24.89	Dipped (no Flow)	40.00	-33.60	5.90	<0.13	15	190	27	0.037	0.83	<0.0017

SAMPLING DATE	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	29	29	28	29	29	29	29	29	29	29	29	29	29	23	12	28	28
Average of detected	3.988	2.056	0.00554	75.9	0.0111	0.00151	0.0255	0.000053	0.000064	0.000213	0.0052	0.00029	0.00103	13.6	4.7	0.559	0.0007456
Std.Dev. Of detected	7.034	1.051	0.00651	56.7	0.0071	0.00226	0.0133	0.000039	0.000124	0.000218	0.0036	0.00029	0.00166	6.8	3.0	0.127	0.0018051
Maximum of Detected	37.800	4.000	0.02000	186.0	0.0320	0.00850	0.0610	0.000166	0.000510	0.001000	0.0210	0.00077	0.00730	24.6	9.9	0.780	0.0081000
Median of Detected	1.800	2.390	0.00310	55.1	0.0088	0.00055	0.0187	0.000049	0.000030	0.000169	0.0048	0.00017	0.00035	14.0	5.8	0.552	0.0002000
Minimum of Detected	0.240	0.039	0.00003	8.1	0.0020	0.00023	0.0130	0.000015	0.000020	0.000088	0.0020	0.00002	0.00009	0.7	0.3	0.260	0.0000890
% of Detected	100	100	64	97	76	93	100	45	52	55	97	48	76	100	100	100	68
DL									<0.00005	<0.0001			<0.0005				
6/27/2016	1.21	2.54	0.00010	25.5	0.0110	0.00030	0.0156	0.000039	0.00002	0.001000	0.00509	0.000518	0.0001			0.478	0.000114
8/23/2016	0.51	2.20	0.00013	28.1	0.0095	0.00055	0.0358	0.000058	0.00004	0.000100	0.00624	0.000074	0.0001			0.431	0.000115
12/6/2016																	
2/21/2017	6.75	3.18	0.00013	49.7	0.0155	0.00041	0.0255	0.000166	0.00007	0.000129	0.00987	0.000621	0.0004			0.748	0.000255
6/14/2017	3.55	2.71	0.00003	48.1	0.0109	0.00033	0.0154	0.000015	0.00003	0.000097	0.00721	0.000749	0.0002			0.604	0.000122
9/13/2017	5.18	2.98	0.00013	55.8	0.0079	0.00030	0.0134	0.000058	0.00002	0.000088	0.00506	0.000262	0.0002	20.6		0.642	0.000089
11/8/2017	5.78	2.90	0.00008	54.3	0.0163	0.00027	0.0130	0.000078	0.00002	0.000178	0.00582	0.000236	0.0002			0.643	0.000151
2/7/2018	37.8	3.04	0.00098	61.7	0.0088	0.00076	0.0132	0.000049	0.00004	0.000163	0.00610	0.000020	0.0006	18.0		0.739	0.000237
5/2/2018	6.41	2.66	0.00004	96.1	0.0079	0.00028	0.0160	0.000027	0.00004	0.000175	0.00583	0.000040	0.0002	21.5		0.603	0.000192
7/11/2018	2.60	2.39	< 0.00002	90.2	0.0053	0.00025	0.0162	0.000027	0.00002	0.000139	0.00479	0.000045	0.00009	20.1		0.514	0.000092
10/17/2018	7.22	2.60	< 0.0004	95.6	0.0040	0.00027	0.0159	< 0.00002	0.00003	0.0001	0.0038	0.00003	0.0002	17.6		0.621	< 0.0001
2/13/2019	3.36	2.64	< 0.0004	177	0.0074	0.00065	0.0161	0.00007	0.00003	0.000241	0.00477	0.00008	0.0005	24.6		0.561	0.0002
5/15/2019	0.76	2.36	< 0.0004	161	0.0057	0.00023	0.0172	0.00005	0.00003	0.0002	0.00442	< 0.00002	0.0003	20.0		0.495	0.0002
8/21/2019	1.55	2.53	< 0.002	186	0.0050	0.0004	0.0184	< 0.0001	< 0.00005	0.0003	0.00310	< 0.0002	0.0007	17.7		0.591	< 0.0005
11/20/2019	10.70	2.41	< 0.0004	138	0.0020	0.00035	0.0187	< 0.00002	< 0.00001	0.0001	0.00256	< 0.00005	0.0003	14.9		0.543	< 0.0001
2/19/2020	1.76	2.18	< 0.0004	98.6	0.0080	0.00024	0.0211	0.00002	0.00003	0.0002	0.00324	0.00010	0.0002	14.0		0.447	< 0.0001
4/29/2020	1.22	2.07	< 0.0004	150.0	0.0050	0.00023	0.018	0.00003	0.00003	0.0002	0.00321	< 0.00005	0.0006	17.4		0.499	0.0002
CIP took over sampling																	
9/23/2020	0.42	1.67		103.0	0.0200	<0.005	0.015	<0.001	<0.001	<0.002	0.0027	<0.001	<0.005	5.92			
11/24/2020																	
3/9/2021																	
4/1/2021	6.7	4	<0.0049	170.0	0.0320	<0.0041	0.026	<0.00060	0.00051	<0.00063	0.0210	<0.0028	<0.0060		9.9	0.73	0.0081
8/17/2021	2.3	3	<0.0011	130.0	<0.015	0.00081	0.023	<0.00062	<0.00020	<0.0025	0.0051	<0.00045	<0.00089	18.0	8.2	0.51	<0.00020
12/13/2021	2.1	2.3	0.0090	32.0	0.0087	0.00160	0.036	<0.00018	<0.00022	<0.0015	0.0056	0.00077	<0.0015	14.0	6.4	0.46	0.00038
3/3/2022	0.87	1.4	0.0180	44.0	0.0130	0.00140	0.059	<0.00027	<0.00022	<0.0015	0.0081	0.00055	0.0034	14.0	6.5	0.78	0.00079
6/30/2022	1.9	0.8	0.0130	33.0	0.019	0.0059	0.051	<0.00062	<0.00020	<0.0025	0.0033	<0.00045	0.0015	13	6.1	0.72	0.00035
08/08/022	0.58	0.097	0.0200	28.0	<0.015	0.0075	0.037	<0.00062	<0.00020	<0.0025	0.002	<0.00045	0.0073	12	5.8	0.71	0.0011
10/27/2022	0.24	0.039	0.0110	21.0	0.021	0.0013	0.034	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.0029	0.72	0.34	0.59	0.0009
3/7/2023	0.64	0.61	0.0043	16.0	<0.015	0.0015	0.03	<0.00062	<0.00020	<0.0025	0.0025	<0.00045	0.0012	4.7	2.2	0.38	0.00058
4/20/2023	0.58	0.3	0.0086	17.0	<0.015	0.0013	0.033	<0.00062	<0.00020	<0.0025	0.0026	<0.00045	0.0015	1.6	0.76	0.44	<0.00020
9/12/2023	0.35	0.91	0.008	12	<0.015	0.0085	0.028	<0.00062	<0.00020	<0.0025	0.0052	<0.00045	<0.00089	5.4	2.5	0.43	<0.00020
12/5/2023	0.81	0.31	0.0021	8.1	<0.015	0.0011	0.017	<0.00062	<0.00020	<0.0025	0.0027	<0.0045	<0.00089	4.4	2.1	0.26	<0.00020
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval																
5/21/2024	1.8	2.8	0.004	23	<0.015	0.0041	0.061	<0.00062	<0.00020	<0.0025	0.0045	<0.00045	<0.00089	12	5.8	0.47	<0.00020

OW-1 Dissolved

SAMPLING DATE	TDS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
Sample Size	31	30	30	30	26	28	30	30	30	30	30	30	30	28	30	30	30	30	30	30	30	30	30	30	19	12	28	28
Average of detected	1118	0.3	123	618	0.7	12.7	182	34	0.13	1.16	0.0011	4.34	2.86	0.0054	72.03	0.0162	0.0014	0.0291	0.00014	0.0001	0.0003	0.0062	0.00024	0.0009	11.51	4.49	0.56	0.000291
Std.Dev. Of detected	361	0.1	79	155	1.6	7.1	49	14	0.21	0.80	0.0012	7.42	3.37	0.0063	55.40	0.0183	0.0019	0.0181	0.00022	0.0001	0.0004	0.0069	0.00024	0.0017	5.83	2.95	0.13	0.000257
Maximum of Detected	2400	0.6	300	840	4.0	42.0	290	62	0.93	3.17	0.0050	37.50	18.00	0.0190	183.00	0.0739	0.0065	0.0890	0.00085	0.0005	0.0018	0.0380	0.00074	0.0073	22.00	10.00	0.77	0.000980
Median of Detected	1095	0.3	122	649	0.0	11.1	180	35	0.06	0.94	0.0006	1.61	2.48	0.0032	51.30	0.0094	0.0004	0.0235	0.00006	0.0000	0.0002	0.0048	0.00024	0.0003	12.00	5.35	0.54	0.000200
Minimum of Detected	540	0.1	21	280	0.0	6.8	89	15	0.01	0.13	0.0002	0.03	0.04	0.0000	8.60	0.0030	0.0001	0.0132	0.00002	0.0000	0.0001	0.0000	0.00001	0.0001	0.67	0.31	0.27	0.000061
% of Detected	97	97	100	100	23	100	100	100	67	100	60	90	100	64	100	67	83	100	53	53	57	97	43	70	100	100	100	61
DL					<0.2															<0.00005	<0.0001			<0.0005				
6/27/2016	1020	0.10	76.9	628		6.79	154	61.5	0.062	0.130	0.00089	0.996	2.59	0.0001	29.0	0.0157	0.00028	0.0170	0.000045	0.00004	0.000100	0.0075	0.00026	0.0001			0.501	0.00006
8/23/2016	812	0.18	63.5	483		6.82	134	47.6	0.024	0.168	0.00022	0.047	2.30	0.0001	29.9	0.0110	0.00049	0.0347	0.000054	0.00005	0.000100	0.0060	0.00002	0.0001	17.0		0.458	0.00009
12/6/2016																												
2/21/2017	1290	0.20	121	825	4.0000	9.77	244	46.5	0.315	0.561	0.00172	6.24	3.12	0.000100	48.8	0.0221	0.00038	0.0259	0.000165	0.00012	0.000307	0.00978	0.000572	0.0004			0.736	0.00023
6/14/2017	1090	0.10	123	765	0.0010	7.75	180	43.7	0.193	0.329	0.00500	3.14	2.73	0.000200	46.1	0.0739	0.00038	0.0254	0.0000254	0.00014	0.000133	0.00755	0.000737	0.0003			0.596	0.00011
9/13/2017	1070	0	123	652	< 0.09	7.97	177	47	0.136	0.318	0.000318	4.78	2.96	<0.00002	55.9	0.011	0.00028	0.0139	0.0000610	0.0000	0.000108	0.00005	0.00028	0.0002	9.61		0.63	0.0001
11/8/2017					< 0.09	7.89	174	46.0	0.1440	0.284	0.00076	5.22	2.86	0.00019	53.8	0.0202	0.00032	0.0133	0.0000800	0.00002	0.000308	0.00613	0.00024	0.0003			0.638	0.000146
2/7/2018	1350	0.31	175.00	803	< 0.09	8.2	214	47.5	0.0310	0.506	0.00052	37.5	3.04	0.00072	60.6	0.0088	0.00068	0.0132	0.0000500	0.00004	0.000132	0.00612	0.00001	0.0005			0.736	0.00023
5/2/2018	1150	0.21	184.00	702	0.008	8.37	181	54.5	0.0425	0.999	0.00038	4.60	2.62	0.00002	94.1	0.0096	0.00019	0.0154	0.000026	0.00006	0.000150	0.00566	0.000041	0.0002			0.602	0.000177
7/11/2018	1120	0.2	198.00	657	0.003	7.46	161	49.1	0.0214	1.14	0.00022	1.81	2.45	0.00004	91.2	0.0064	0.00021	0.0165	0.000030	0.00002	0.000157	0.00486	0.000046	0.0001			0.531	0.000123
10/17/2018	1290	0.32	185.00	713		8.79	209	51.7	0.0196	1.190	0.00048	5.9	2.79	< 0.0004	101.0	0.0051	0.00027	0.0165	< 0.00002	0.00005	0.000206	0.00401	0.00002	0.0002			0.657	< 0.0001
2/13/2019	1510	0.16	269.00	724		10.7	171	46.1	0.0681	2.830	0.00071	1.61	2.61	< 0.0004	177.0	0.0091	0.00032	0.0168	0.00007	0.00004	0.0002	0.00518	0.00005	0.0005			0.559	0.0002
5/15/2019	1350	0.25	223.00	650	0.003	11.1	156	39.8	0.0248	2.660	0.00021	0.184	2.43	< 0.0004	163.0	0.0059	0.00013	0.0173	0.00006	0.00003	0.0002	0.00458	< 0.00002	0.0003			0.503	0.0002
8/21/2019	1520	0.38	236.00	765	< 0.002	13	197	42.2	0.0600	3.170	< 0.001	0.853	2.5	< 0.002	183.0	0.0060	0.00040	0.0187	< 0.0001	< 0.00005	0.0004	0.00328	< 0.0002	0.0004	17.7		0.583	< 0.0005
11/20/2019	1320	0.32	191.00	647	< 0.002	11.4	175	38.0	< 0.005	2.160	< 0.0002	9.46	2.38	< 0.0004	139.0	0.0030	0.00032	0.019	< 0.00002	0.00001	0.0002	0.00277	< 0.00005	0.0002	14.9		0.547	< 0.0001
2/19/2020	977	0.26	138.00	497	< 0.002	8.41	135	31.5	0.0100	1.300	0.00050	1.35	2.2	< 0.0004	101.0	0.0060	0.00019	0.0213	0.00002	0.00003	0.0002	0.00361	< 0.00005	0.0002	14.0		0.453	< 0.0001
4/29/2020	1220	0.26	183.00	619	0.002	9.77	155	29.5	< 0.005	2.190	0.00030	0.03	2.08	< 0.0004	152.0	0.0051	0.00018	0.0177	0.00002	0.00003	0.0002	0.00326	< 0.00005	0.0006			0.496	0.0002
CIP took over sampling																												
9/23/2020	924	0.265	140.00	512																								
11/24/2020	650	<0.5	81.00	290	<0.2		89	21.0	<0.05	0.940	<0.002	9.30	18		65.0	<0.02	<0.005	0.089	0.00038	<0.001	<0.002	0.0015	<0.001	<0.005	13			
3/9/2021	640	0.14	34.00	410	<0.13		100	18.0	0.9300	0.640	0.00220	11.00	10		38.0	0.0570	<0.00075	0.065	0.00085	0.00047	<0.00098	0.0380	<0.00045	<0.00089	16.0			
4/1/2021	1600	0.18	300.00	830	<0.13	12	190	46.0	0.3100	2.000	<0.0017	8.00	3.9	<0.0049	160.0	0.0300	<0.00075	0.024	0.00032	<0.00020	0.0018	0.0170	<0.00045	<0.00089	22.0	10.0	0.77	<0.0027
8/17/2021	1200	0.57	180.00	530	<0.13	12	140	32.0	0.1100	1.600	<0.0017	0.84	3.1	<0.0011	140.0	<0.015	0.00130	0.023	<0.00062	<0.00020	<0.0025	0.0045	<0.00045	<0.00089	17.0	7.7	0.51	<0.00020
12/13/2021	870	0.33	60.00	490	<0.13	13	180	18.0	0.0200	0.940	<0.00063	0.33	2.3	0.009	32.0	0.0069	0.00610	0.032	<0.00018	<0.00022	<0.0015	0.0048	0.00039	<0.0015	11.0	5.3	0.46	0.00035
3/3/2022	1200.00	0.12	100.00	680	<0.13	42	240	20.0	0.1200	0.920	0.00160	2.20	1.4	0.018	44.0	0.0110	0.00260	0.060	<0.00027	<0.00022	<0.0015	0.0093	0.00050	0.0033	14.0	6.5	0.77	0.00062
6/30/2022	970	0.38	63.00	800	<0.13	23	270	19.0	<0.034	1.10	<0.0017	0.43	0.79	0.013	33.0	<0.015	0.0029	0.048	<0.00062	<0.00020	<0.0025	0.0028	<0.00045	0.001	12	5.7	0.73	<0.00020
8/8/2022	1100	0.49	51.00	750	<0.13	18	290	19.0	<0.034	1.30	0.0021	<0.047	0.054	0.019	27	<0.015	0.0051	0.036	<0.00062	<0.00020	<0.0025	0.0016	<0.00045	0.0073	12	5.4	0.69	0.00098
10/27/2022	2400	0.48	43.00	840	<0.13	18	290	15.0	<0.034	1.50	<0.0017	<0.047	0.040	0.0100	20	<0.015	<0.00075	0.031	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.0025	0.670	0.31	0.54	0.00074
3/7/2023	790	0.15	29.00	470	<0.13	11	180	15	<0.034	0.86	<0.0017	0.063	0.61	0.0042	16	<0.015	0.00093	0.028	<0.00062	<0.00020	<0.0025	0.0026	<0.00045	<0.00089	4.6	2.1	0.38	0.00039
4/20/2023	830	0.30	34.00	500	<0.13	14	180	15	<0.034	0.93	<0.0017	0.15	0.28	0.0088	17	<0.015	0.00097	0.032	<0.00062	<0.00020	<0.0012	0.0031	<0.00045	0.0012	1.5	0.72	0.42	<0.00020
9/12/2023	830	0.41	31.00	490	<0.13	20	190	27	<0.034	0.91	<0.0017	<0.047	0.78	0.008	12	<0.015	0.0065	0.026	<0.00062	<0.00020	<0.0012	0.0049	<0.00045	<0.00089	5.3	2.5	0.44	<0.00020
12/5/2023	540	0.23	21.00	280	<0.13	13	120	19	<0.034	0.55	<0.0017	0.12	0.31	0.0024	8.6	<0.15	<0.00075	0.017	<0.00062	<0.00020	<0.0012	0.003	<0.00045	<0.00089	4.5	2.1	0.27	<0.00020
Sampling frequency Changed to Semi-Annual basis per ODNR Approval																												
5/21/2024	910.00	0.23	44.00	540.00	<0.13	15	180	26	0.048	0.81	0.0017	0.96	2.7	0.004	23	<0.015	0.0028	0.059	<0.00062	<0.00020	<0.0012	0.0053	<0.00045	<0.00089	12	5.6	0.45	<0.00020

SEEP 1 Total

SAMPLING DATE	Field Measurements pH	Field Measurements Cond microS/cm	Field Measurements Redox mv	Field Measurements Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L
3/31/2022	6.31	767	54	18.2	<2.6	17	530	66	0.1	66
6/22/2022	6.41	595	101	22.65	<2.6	19	290	14	0.22	300
8/9/2022	No Sample (Dry)									
10/27/2022	No Sample (Dry)									
3/7/2023	No Sample (Dry)									
4/20/2023	No Sample (Dry)									
9/12/2023	No Sample (Dry)									
12/4/2023	No Sample (Dry)									
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval									
5/21/2024	No Sample (Dry)									

SAMPLING DATE	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L
3/31/2022	290	<0.13	5.3	82	25	1.1	0.18	0.0013	18	2.4	<0.00061
6/22/2022	900	<0.13	3.2	45	17	3.4	0.12	0.0049	25	3.3	<0.0011

SAMPLING DATE	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
3/31/2022	39	0.015	0.0013	0.045	<0.00027	<0.00022	0.002	0.0085	0.0007	<0.00074	23	96	0.32	<0.00047
6/22/2022	23	0.044	0.0022	0.066	<0.00062	0.00046	0.0025	0.031	0.0037	<0.00089	26	12	0.19	<0.00020

EP 1 Dissolved

SAMPLING DATE	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L
3/31/2022	<2.6	17	530	66	0.1	66	290	<0.13	5.2	84	25	0.049	0.18	0.0015	13	2.3
6/22/2022	<2.6	19	290	14	0.22	300	900	<0.13	2.9	47	18	0.44	0.12	0.0024	1.1	3.5
8/9/2022	No Sample															
10/27/2022	No Sample															
3/7/2023	No Sample															
4/20/2023	No Sample															
9/12/2023	No Sample															
12/4/2023	(Dry)															
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval															
5/21/2024	No Sample (Dry)															

SAMPLING DATE	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
3/31/2022	<0.00061	39	0.016	0.00033	0.042	<0.00027	<0.00022	<0.0015	0.0077	<0.00017	<0.00074	21	9.6	0.32	<0.00047
6/22/2022	<0.0011	24	0.04	<0.00075	0.052	<0.00062	0.00045	<0.0025	0.029	<0.00045	<0.00089	19	8.7	0.2	<0.00020

SEEP 2 Total

SAMPLING DATE	Field Measurements pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L
3/31/2022	6.51	2880	141	18.38	12	11	2000	44	0.24	310	1000
6/22/2022	5.79	2590	125	26.57	25	-16.6	1600	140	0.16	300	900
8/9/2022	6.09	4910	233	20.71	54	-37.9	3200	6.6	0.16	730	1800
10/27/2022	6.5	6460	233	13.75	64	-21.6	5800	20	0.089	110	670
3/7/2023	5.66	5570	143	14.31	41	5	4100	8	0.05	830	1900
4/20/2023	6.70	4710	11	25.68	90	-84.2	3900	38	0.16	770	1800
9/12/2023	5.36	6580	139	16.77	55	-314	5100	4600	<0.12	980	2800
12/5/2023	6.80	6590	78	12.05	61	-320	4300	5.3	0.18	900	2600
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval										
5/24/2024	6.89	1080	235	26.01	59	-58.1	2100	14	0.26	330	1000

SAMPLING DATE	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L
3/31/2022	<0.13	28	190	56	0.17	6.4	<0.0011	7.7	5	<0.00061
6/22/2022	<0.13	22	160	53	0.2	4	<0.0017	30	4.5	<0.0011
8/9/2022	<0.13	41	260	83	<0.034	10	<0.0017	4.9	7.5	<0.0011
10/27/2022	<0.13	54	360	120	0.057	19	<0.0017	8.3	11	<0.0011
3/7/2023	<0.13	42	290	89	0.27	14	<0.0017	11	8.9	<0.0011
4/20/2023	<0.13	43	200	62	0.043	14	<0.0017	8.6	6.8	<0.0011
9/12/2023	<0.13	59	330	99	2.7	19	0.0053	100	9.3	0.0016
12/5/2023	<0.13	57	350	110	0.034	19	<0.0017	14	9.9	<0.0011
5/24/2024	<0.13	27	190	39	0.038	7.9	<0.0017	17	3.7	<0.0011

SAMPLING DATE	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
3/31/2022	400	0.012	0.0022	0.012	<0.00027	<0.00022	<0.0015	0.016	0.00023	<0.00074	16	7.3	0.64	<0.00047
6/22/2022	330	0.018	0.0045	0.012	<0.00062	<0.00020	<0.0025	0.011	<0.00045	<0.00089	19	8.8	0.62	<0.00020
8/9/2022	810	<0.015	0.0018	0.013	<0.00062	<0.00020	<0.0025	0.011	<0.00045	0.0013	16	7.3	0.99	0.00025
10/27/2022	1300	<0.015	0.0017	0.015	<0.00062	<0.00020	<0.0025	0.017	<0.00045	0.00099	17	7.8	1.5	0.00028
3/7/2023	890	<0.015	0.0019	0.013	<0.00062	<0.00020	<0.0025	0.013	<0.00045	<0.00089	18	8.5	1.2	0.00029
4/20/2023	870	<0.015	0.0022	0.01	<0.00062	<0.00020	<0.0025	0.013	<0.00045	<0.00089	17	8.0	0.92	<0.00020
9/12/2023	1300	0.027	0.022	0.031	<0.00062	<0.00020	0.004	0.027	0.0038	0.0013	29	14	1.5	0.00031
12/5/2023	1200	<0.015	0.0017	0.014	<0.00062	<0.00020	<0.0025	0.016	<0.00045	<0.00089	17	7.8	1.5	<0.00020
5/24/2024	410	<0.015	0.003	0.01	<0.00062	<0.00020	<0.0025	0.007	<0.00045	<0.00089	18	8.5	0.61	<0.00020

:EP 2 Dissolved

SAMPLING DATE	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L
3/31/2022	12	11	2000	44	0.24	310	1000	<0.13	28	190	57	0.02	6.5	0.0014	2.2
6/22/2022	25	-16.6	1600	140	0.16	300	900	<0.13	22	160	52	0.062	4	<0.0017	21
8/9/2022	54	-37.9	3200	6.6	0.16	730	1800	<0.13	41	260	83	<0.034	10	0.0021	4.4
10/27/2022	64	-21.6	5800	20	0.089	110	670	<0.13	53	360	120	<0.034	19	<0.0017	7.0
3/7/2023	41	5	4100	8	0.05	830	1900	<0.13	39	280	85	0.2	14	<0.0017	8.4
4/20/2023	90	-84.2	3900	38	0.16	770	1800	<0.13	43	210	63	<0.034	14	<0.0017	5.7
9/12/2023	55	-314	5100	4600	<0.12	980	2800	<0.13	59	330	97	<0.034	20	<0.0017	7.7
12/5/2023	61	-320	4300	5.3	0.18	900	2600	<0.13	56	350	9.7	<0.034	18	<0.0017	14
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval														
5/24/2024	59	-58.1	2100	14	0.26	330	1000	<0.13	28	190	41	<0.034	7.6	<0.0017	15

SAMPLING DATE	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
3/31/2022	4.9	<0.00061	400	0.013	0.00029	0.012	<0.00027	<0.00022	<0.0015	0.015	0.00019	<0.00074	15	6.9	0.64	<0.00047
6/22/2022	4.4	<0.0011	320	0.023	0.0026	0.015	<0.00062	<0.00020	<0.0025	0.011	<0.00045	<0.00089	18	8.6	0.62	<0.00020
8/9/2022	7.5	<0.0011	820	<0.015	0.0016	0.013	<0.00062	<0.00020	<0.0025	0.012	<0.00045	0.001	15	7	1	0.00023
10/27/2022	12.0	<0.0011	1200	0.017	0.0014	0.015	<0.00062	<0.00020	<0.0025	0.017	<0.00045	0.00093	16	7.7	1.4	0.00025
3/7/2023	9	<0.0011	850	<0.015	0.0012	0.012	<0.00062	<0.00020	<0.0025	0.014	<0.00045	<0.00089	17	7.8	1.1	0.00027
4/20/2023	6.8	<0.0011	880	<0.015	0.0012	0.010	<0.00062	<0.00020	<0.0012	0.013	<0.00045	<0.00089	17	7.9	0.92	<0.00020
9/12/2023	9.6	<0.0011	1300	<0.015	<0.00075	0.014	<0.00062	<0.00020	<0.0012	0.02	<0.00045	0.00095	17	7.8	1.6	0.00021
12/5/2023	9.7	<0.0011	1200	<0.015	0.0025	0.014	<0.00062	<0.00020	<0.0012	0.016	<0.00045	<0.00089	15	6.9	1.5	<0.00020
5/24/2024	3.8	<0.0011	420	<0.015	0.002	0.011	<0.00062	<0.00020	<0.0012	0.0071	<0.00045	<0.00089	18	8.4	0.63	<0.00020

CB-1 Total

SAMPLING DATE	pH	Cond microS/cm	Redox mv	Temperature °C	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L
	Field Measurements											
3/31/2022	8.16	2720	74	18.07	62	-31.2	2300	14	0.68	190	1400	<0.13
6/22/2022	7.34	3310	-71	22.11	22	<5.0	2600	69	0.41	220	1900	0.45
8/9/2022	No Sample											
10/27/2022	No Sample											
3/7/2023	No Sample											
4/20/2023	No Sample											
9/12/2023	No Sample											
12/4/2023	No Sample (Dry)											
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval											
5/24/2024	No Sample (Dry)											

SAMPLING DATE	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
3/31/2022	38	420	42	0.78	4.3	0.0012	1.3	0.95	0.035	230	0.0031	0.045	0.035	<0.00027	<0.00022	<0.0015	0.002	0.001	0.0028	11	5.4	0.98	<0.00047
6/22/2022	120	570	19	0.36	3.3	<0.0017	0.49	0.041	0.076	130	<0.015	0.13	0.041	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.0084	5.4	2.5	1.9	<0.00020

:B-1 Dissolved

SAMPLING DATE	Alkalinity mg/L CaCO3	Acidity mg/L CaCO3	TDS mg/L	TSS mg/L	Fluoride mg/L	Chloride mg/L	SO4 mg/L	Hg ug/L	K mg/L	Ca mg/L	Mg mg/L	Al mg/L	B mg/L	Cu mg/L	Fe mg/L
3/31/2022	62	-31.2	2300	14	0.68	190	1400	<0.13	39	430	45	0.12	4.3	<0.0011	<0.028
6/22/2022	22	<5.0	2600	69	0.41	220	1900	<0.13	120	600	20	0.16	3.4	<0.0017	<0.047
8/9/2022															
10/27/2022															
3/7/2023															
4/20/2023															
9/12/2023	No Sample														
12/4/2023	No Sample (Dry)														
	Sampling frequency Changed to Semi-Annual basis per ODNR Approval														
5/24/2024	No Sample (Dry)														

SAMPLING DATE	Mn mg/L	Mo mg/L	Na mg/L	Zn mg/L	As mg/L	Ba mg/L	Be mg/L	Cd mg/L	Cr mg/L	Ni mg/L	Pb mg/L	Se mg/L	SiO2 mg/L	Si mg/L	Sr mg/L	Tl mg/L
3/31/2022	0.97	0.028	240	<0.0029	0.049	0.03	<0.00027	<0.00022	<0.0015	0.0094	<0.00017	0.0038	9.6	4.5	0.97	<0.00047
6/22/2022	0.042	0.089	130	<0.015	0.17	0.041	<0.00062	<0.00020	<0.0025	<0.0015	<0.00045	0.01	5	2.3	2	<0.00020
8/9/2022																
10/27/2022																
3/7/2023																
4/20/2023																
9/12/2023																
12/4/2023																
5/24/2024																