



November 11, 2022

Mrs. Janet Binns
Environmental Protection Specialist
Colorado Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203

**RE: Annual Hydrology Report
New Horizon Mine
Permit No. C-1981-008**

Dear Mrs. Binns:

Enclosed please find the Annual Hydrology Report for the 2022 Water Year (October 2021 – September 2022) for Elk Ridge Mining and Reclamation, LLC (Elk Ridge) New Horizon Mine. Tri-State Generation and Transmission Association, Inc. (Tri-State) is the parent to Elk Ridge, and in accordance with Rule 4.05.13(4)(c) is submitting the Annual Hydrology Report on behalf of the New Horizon Mine.

If you have any questions about the enclosed minor revision, please contact Tony Tennyson at (970) 326-3560 or ttennyson@tristategt.org.

Sincerely,

DocuSigned by:

A handwritten signature in black ink that reads "Chris Gilbreath".

D250C711D0BF450...

Chris Gilbreath
Senior Manager,
Remediation and Reclamation

CG:TT:der

Enclosures

cc: Tony Tennyson (via email)
File: G474-11.3(21)b-5

2022 Annual Hydrology Report

Water Year October 1, 2021 to September 30, 2022

Elk Ridge Mining and Reclamation, LLC

New Horizon Mine

Permit No. C-1981-008

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Rule 4.05.13(4)(c) Annual Hydrology Report Requirements

(i) Water quantity monitoring data for the water year is presented Appendix 1 and Appendix 2 of this report.

(ii) Water quality monitoring data for the water year is presented in Appendix 1 and Appendix 2 of this report. Discharge monitoring reports (DMR) are submitted to the Colorado Department of Public Health and Environment. Copies of each DMR are provided monthly to the Division during the report year and are included in this report by reference only.

(iii) A written interpretation of the data has been requested by the Division in accordance with Rule 4.05.13(4)(c)(iii) and is included within this annual hydrology report.

The monitoring timeframe for this annual hydrology report is from October 1, 2021 through September 30, 2022.

A description of the surface and ground water monitoring plan including the monitoring frequency is located in Section 2.04.7. All monitoring locations are shown on Map 2.04-7-1A. This information can be found in Permit No. C-1981-008.

Surface Water

Surface water monitoring is comprised of two monitoring locations, which are located up gradient and down gradient of mining and reclamation areas on Tuttle Draw. SW-N1 represents the upstream condition above mining and reclamation, and SW-N3 represents the downstream condition.

Surface water monitoring data for the water year for both sites can be found in Appendix 1.

New Horizon samples both surface water monitoring locations for a variety of quality parameters. Of all the parameters that are analyzed, several key indicator parameters have been identified and are addressed annually for the hydrology report. These parameters are lab pH, lab conductivity, TDS, sulfate, calcium, iron, magnesium, and sodium.

SW-N1 and SW-N3 – Tuttle Draw

Data for the indicator parameters for the up gradient surface monitoring location SW-N1 and the down gradient surface water monitoring location SW-N3, has been compiled and are shown on the summary tables below. The summary data tables provided data for each surface water monitoring locations from 2001 to 2022 if available.

Surface water monitoring data for the water year for both sites can be found in Appendix 1. Appendix 2 contains a graphical representation of all surface water monitoring data with a linear regression to help define any applicable trends that may be apparent in the monitoring data.

Summary of the indicator parameters for each surface water monitoring location are provided as follows:

SW-N1							
Parameter	Mean	Std dev	Range	Max.	Min.	Max at	Min at
Lab pH	8.3	0.3	1.4	8.5	7.1	2/18/11	11/13/18
Lab Cond. (umhos/cm)	930	595	2,613	2,910	297	9/26/12	6/5/19
TDS (mg/l)	708	557	2,509	2,690	181	9/26/12	8/24/07
Sulfate (mg/l)	314	289	1,653	1,700	48	9/26/12	6/5/19
Calcium (mg/l)	118	75	455	496	41	9/26/12	6/5/19
Iron (ug/l)	1,187	1,641	8,890	9,050	160	8/16/07	2/24/06
Magnesium (mg/l)	53	49	196	204	8	9/26/12	8/17/07
Sodium (mg/l)	21	17	61	66	5	2/17/06	8/20/07

SW-N3							
Parameter	Mean	Std dev	Range	Max.	Min.	Max at	Min at
Lab pH	8.2	0.2	1.4	8.6	7.2	9/4/08	8/16/02
Lab Cond. (umhos/cm)	1,801	928	3,240	3,640	400	2/10/15	8/13/07
TDS (mg/l)	1,583	986	3,208	3,440	232	2/10/15	8/24/17
Sulfate (mg/l)	897	607	2,130	2,220	90	2/10/15	8/17/07
Calcium (mg/l)	249	139	549	558	9	8/31/02	5/24/21
Iron (tot rec ug/l)	1,083	1,608	10,470	10,600	130	8/16/07	5/17/08
Magnesium (mg/l)	111	74	246	259	13	2/10/15	11/21/07
Sodium (mg/l)	57	45	204	212	8	2/20/12	8/20/07

A review of the water year data indicates that all sample results trended within previous results, with the mean of all the indicator parameters remaining relatively constant. influences from irrigation water on Tuttle Draw are readily apparent during the irrigation season at and around New Horizon Mine.

Surface Water Data Interpretation

As shown on the graphs in Appendix 2 for the indicator parameters, when comparing the up gradient and down gradient locations, SW-N3 tends to historically trend higher for some the indicator parameters including calcium, laboratory conductivity, magnesium, sodium, sulfate and TDS. Iron and pH tend to historically trend higher at the up-gradient location SW-N1. Iron is historically trending down at both locations.

Overall, the indicator parameters as shown in Appendix 2 for up gradient and down gradient of mining and reclamation areas are stable. Long term monitoring results indicate normal seasonal fluctuations within Tuttle Draw, with the seasonal influences from local irrigation water being readily apparent when active irrigation is occurring.

Groundwater

New Horizon currently samples each groundwater site for a variety of quality parameters. Of all the parameters that are analyzed for, several key indicator parameters are identified and are addressed annually for this hydrology report. These are lab pH, lab conductivity, TDS, sulfate, calcium, iron, manganese, sodium and magnesium.

Ground water monitoring data for the water year can be found in Appendix 3. Appendix 4 contains a graphical representation of all ground water monitoring data with a linear regression to help define any applicable trends that may be apparent in all the monitoring data. Groundwater elevations where data is available are provided in Appendix 5.

Wells GW-N36, GW-N37, and GW-N38

GW-N36 monitors the overburden aquifer, GW-N37 monitors the Dakota coal aquifer, and GW-N38 monitors the underburden aquifer. This cluster of wells represent the groundwater quality up gradient of the mining area.

Summary of the indicator parameters for each well are provided as follows:

GW-N36							
Parameter	Mean	Std dev	Range	Max.	Min.	Max at	Min at
Lab pH	7.5	0.6	3.2	8.5	5.3	2/19/14	6/21/22
Lab Cond. (umhos/cm)	1,383	481	1,480	1,940	460	11/20/07	6/9/20
TDS (mg/l)	991	355	1,040	1,400	360	12/7/20	6/9/20
Sulfate (mg/l)	411	112	406	572	166	11/16/16	6/9/20
Calcium (mg/l)	146	53	176	216	40	2/23/11	5/23/18
Iron (mg/l)	0.068	0.058	0.151	0.170	0.019	3/10/20	6/21/21
Manganese (mg/l)	0.12	0.08	0.37	0.40	0.032	8/29/08	5/20/15
Sodium (mg/l)	66	27	83	101	18	2/23/11	6/9/20
Magnesium (mg/l)	69	28	96	112	16	2/23/11	6/9/20

GW-N37							
Parameter	Mean	Std dev	Range	Max.	Min.	Max at	Min at
Lab pH	4.9	0.6	2.5	6.4	3.9	5/18/16	5/15/06
Lab Cond. (umhos/cm)	504	102	502	848	346	9/7/22	7/26/18
TDS (mg/l)	326	70	384	610	226	9/7/22	7/25/17
Sulfate (mg/l)	195	36	143	290	147	9/7/22	7/26/18
Calcium (mg/l)	46	13	60	90	30	9/7/22	7/26/18
Iron (mg/l)	0.046	0.035	0.071	0.098	0.027	9/7/22	6/21/22
Manganese (mg/l)	0.03	0.01	0.05	0.06	0.012	5/18/16	6/21/22
Sodium (mg/l)	18	3	11	25	14	9/7/22	5/20/15
Magnesium (mg/l)	19	5	21	32	11	9/7/22	7/26/18

GW-N38							
Parameter	Mean	Std dev	Range	Max.	Min.	Max at	Min at
Lab pH	8.0	0.1	0.3	8.1	7.8	8/25/08	6/24/19
Lab Cond. (umhos/cm)	1,261	191	475	1,410	935	6/24/19	5/13/11
TDS (mg/l)	933	191	525	1,160	525	6/24/19	5/23/11
Sulfate (mg/l)	406	79	202	472	270	6/24/19	5/18/11
Calcium (mg/l)	268	47	118	308	190	8/17/09	5/16/11
Iron (mg/l)	0	0	0	0	0	NA	NA
Manganese (mg/l)	0.0065	0.009	0.0201	0.0226	0.0025	6/24/19	8/29/08
Sodium (mg/l)	14	7	17	24	8	6/24/19	5/16/11
Magnesium (mg/l)	18	3	8	23	15	6/24/19	5/16/11

A review of the water year for this series of wells indicates one minimum occurred at GW-N36 for pH. GW-38 was dry all water year. GW-N37 had a significant number of maximums values during the water including laboratory conductivity, TDS, sulfate, calcium, iron, sodium, and magnesium. GW-N37 also had two minimum values for iron and manganese respectively. These three wells are not influenced by the mining and reclamation activities at New Horizon and express the up gradient condition above mining.

Wells GW-N44, GW-N45, and GW-N46

GW-N44 monitors the overburden aquifer, GW-N45 monitors the Dakota coal aquifer, and GW-N46 monitors the underburden aquifer. This cluster of wells monitors the groundwater quality down gradient of the mining area.

Summary of the indicator parameters for each well are provided as follows:

GW-N44							
Parameter	Mean	Std dev	Range	Max.	Min.	Max at	Min at
Lab pH	7.9	0.3	1.9	8.6	6.7	2/18/14	6/1/03
Lab Cond. (umhos/cm)	3,065	1,592	11,386	12,300	914	6/6/17	12/7/20
TDS (mg/l)	2,878	1,779	12,400	13,800	1,400	6/6/17	6/1/22
Sulfate (mg/l)	1,804	1,297	8,800	9,510	710	6/6/17	12/1/22
Calcium (mg/l)	363	80	362	514	152	3/13/02	6/6/17
Iron (mg/l)	0.01	0.004	0.013	0.02	0.007	3/23/22	12/7/20
Manganese (mg/l)	0.39	0.64	4.51	4.51	0.0006	2/27/18	6/23/21
Sodium (mg/l)	154	181	1,321	1,350	29	6/6/17	11/12/13
Magnesium (mg/l)	253	242	1,892	1,970	79	6/6/17	3/16/20

GW-N45							
Parameter	Mean	Std dev	Range	Max.	Min.	Max at	Min at
Lab pH	8.2	0.2	1.7	8.8	7.1	2/19/14	6/1/03
Lab Cond. (umhos/cm)	7,081	3,332	12,840	14,700	1,860	5/20/15	6/6/17
TDS (mg/l)	7,199	5,000	17,140	18,600	1,460	11/14/12	6/6/17
Sulfate (mg/l)	4,310	3,779	13,030	13,400	370	8/17/15	12/28/01
Calcium (mg/l)	102	65	288	307	19	11/14/12	12/1/21
Iron (mg/l)	0.115	0.236	0.684	0.700	0.016	12/10/20	9/7/22
Manganese (mg/l)	0.40	0.60	1.92	1.92	0.003	3/14/17	6/6/17
Sodium (mg/l)	1,039	257	1,479	1,520	41	11/14/12	6/6/17
Magnesium (mg/l)	797	823	2,734	2,800	66	11/14/12	3/13/02

GW-N46							
Parameter	Mean	Std dev	Range	Max.	Min.	Max at	Min at
Lab pH	8.5	0.2	2.1	8.8	6.7	2/25/08	6/1/03
Lab Cond. (umhos/cm)	3,158	218	1,340	3,580	2,240	2/17/06	12/10/20
TDS (mg/l)	2,174	102	550	2,540	1,990	7/19/05	11/12/13
Sulfate (mg/l)	744	62	264	860	596	1/9/02	2/18/14
Calcium (mg/l)	15	30	257	264	7	6/4/05	2/9/16
Iron (mg/l)	0.042	0.035	0.102	0.116	0.014	6/1/22	3/23/21
Manganese (mg/l)	0.02	0.03	0.16	0.16	0.003	6/29/21	2/10/15
Sodium (mg/l)	746	44	216	833	617	3/9/05	2/9/16
Magnesium (mg/l)	9	3	24	30	6	6/4/05	2/9/16

A review of the water year for this series of wells down gradient to the mining and reclamation areas indicates one maximum value for iron occurred at GW-N46, and two minimum sampling results for TDS and sulfate. At GW-N45, two minimum values were obtained for calcium and iron. Finally, one maximum value for iron occurred at GW-N46.

Groundwater Data Interpretation

The graphs in Appendix 4 provides the indicator parameters in comparison with the up gradient and down gradient locations with the overburden aquifer, coal aquifer, and underburden aquifer compared accordingly.

Overburden Aquifer

When comparing the up gradient (GW-N36) and down gradient (GW-N44) wells for the overburden aquifer, G-N44 tends to historically trend higher for the indicator parameters with the exception of iron. The up-gradient conditions for the indicator parameters trend in a consistent manner with seasonal influences from local irrigation readily apparent in the data. The down gradient conditions are all trending significantly downward with the expectation of pH was is trending slight upward over time.

Coal Aquifer

When comparing the up gradient (GW-N37) and down gradient (GW-N45) wells for the Dakota Spring aquifer, G-N37 historically trends lower for all the indicator parameters. Further, the data indicates that the Dakota Aquifer up gradient of mining and reclamation trends in a stable manner. Data obtained from GW-45 historically trends higher than the up-gradient condition. All of the indicator parameters for GW-45 are trending upward; however, sampling results for the past ten quarters of sampling (with the exception of pH and iron) are showing a significant downward trend. This indicates that impacts from mining and reclamation on the down gradient coal aquifer are stabilizing out. Seasonal influences from local irrigation are not apparent in the data obtained from either well.

Underburden Aquifer

When comparing the up gradient (GW-N38) and down gradient (GW-N46) wells for the underburden aquifer, G-N38 historically tends to be dry thus the data evaluation is limited. Data obtained from GW-46 reveals for that all the indicator parameters are stable with a few outliers of high analytical results. Seasonal influences from local irrigation are not apparent in the data obtained from either well.

Groundwater Elevations

Groundwater elevations from all the wells are presented in Appendix 5. Data for GW-N36 and GW-N44 indicates a stable static water levels with noticeable seasonal influences from irrigation. GW-N37 (when water is available) and GW-N45 also indicated a stable water level in the Dakota Aquifer. More variability is present in underburden aquifer as shown for GW-N46, especially in the years when mining occurred. Overall, since reclamation has occurred water levels in the underburden aquifer (GW-N46) are stabilizing.

Appendix 1
Surface Water Monitoring Data

New Horizon Mine

Analysis Results by Date (column) and Parameter (row)

Date Range: 10/01/2021 to 09/30/2022

Site: SW-N1

	10/5/2021	1/18/2022	5/11/2022	7/14/2022
pH (field), pH	8.5	7.6	8.5	8.3
pH (lab), pH	8.3	8.3	8.3	8.2
Spec. Cond. (lab)	513	1710	388	490
Spec Cond. (field)	489	1655	381	498
TDS, mg/L	310	1500	270	340
TSS, mg/L	75	<5.0	69	25
Ca, diss, mg/L	75	200	53	72
Mg, diss, mg/L	11	110	13	15
NH3 as N, diss, mg/L	<0.05	<0.05	<0.05	<0.05
NO2 + NO3, diss, mg/L	<0.02	<0.02	0.057	<0.02
Na, diss, mg/L	7	42	6.5	7.6
SO4, diss, mg/L	120	640	87	130
As, tot rec, ug/L	1.4	0.65	2.1	1.6
Fe, tot rec, ug/L	1000	380	1400	670
Hg, tot, mg/L	<0.002	<0.002	<0.002	<0.002
Mn, diss, mg/L	<0.010	0.25	<0.010	<0.010
Se, diss, mg/L	0.00035	0.0002	0.00039	0.00034
Zn, tot rec, ug/L	26	<20	60	<20
PO4, tot, mg/L	0.22	0.034	0.04	0.03
Pb, tot rec, mg/L	4.0	<0.10	14	3.8
HCO3, mg/L	110	420	93	120
SAR, ratio	0.2	0.59	0.21	0.21
Cl, diss, mg/L	4	18	3.2	5.4
Al, tot rec, ug/L	2100	<50	3200	250
Cd, tot rec, mg/L	0.16	0.052	0.3	0.31
Cu, diss, mg/L	0.00087	<0.00080	0.0063	0.0015

New Horizon Mine
Analysis Results by Date (column) and Parameter (row)

Date Range: 10/01/2021 to 09/30/2022

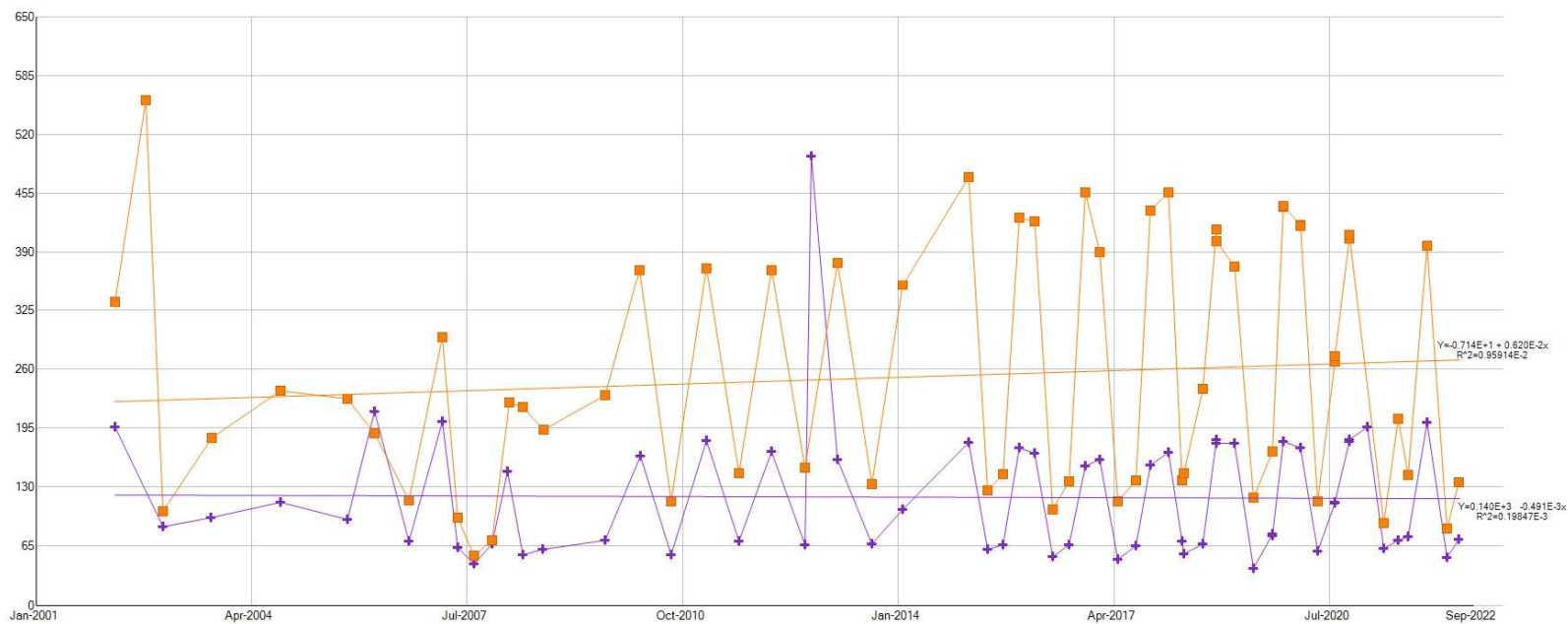
Site: SW-N3

	10/5/2021	1/18/2022	5/11/2022	7/14/2022
pH (field), pH	8.3	7.8	8.2	7.7
pH (lab), pH	8.2	8.3	8.3	8.1
Spec. Cond. (lab)	1100	2960	671	1010
Spec Cond. (field)	1015	2941	638	1021
TDS, mg/L	750	2800	480	770
TSS, mg/L	85	<5.0	72	46
Ca, diss, mg/L	140	400	85	140
Mg, diss, mg/L	42	180	27	43
NH3 as N, diss, mg/L	0.14	1.3	<0.050	0.13
NO2 + NO3, diss, mg/L	0.037	0.2	0.058	0.038
Na, diss, mg/L	23	88	15	23
SO4, diss, mg/L	390	1600	210	410
As, tot rec, ug/L	1.5	0.67	1.6	1.4
Fe, tot rec, ug/L	1300	330	1400	980
Hg, tot, mg/L	<0.00020	<0.00020	<0.00020	<0.00020
Mn, diss, mg/L	0.075	0.9	0.022	0.048
Se, diss, mg/L	0.00032	<0.00020	0.00038	0.00029
Zn, tot rec, ug/L	24	<40	38	<20
PO4, tot, mg/L	0.16	<0.030	<0.030	0.081
Pb, tot rec, mg/L	4.1	<0.20	9.3	3.1
HCO3, mg/L	180	450	120	170
SAR, ratio	0.43	0.94	0.36	0.45
Cl, diss, mg/L	6.1	17	3.7	5.8
Al, tot rec, ug/L	2000	<100	3000	420
Cd, tot rec, mg/L	0.14	0.074	0.21	0.14
Cu, diss, mg/L	0.0016	<0.0016	0.0043	<0.00080

Appendix 2
Surface Water Monitoring Graphs

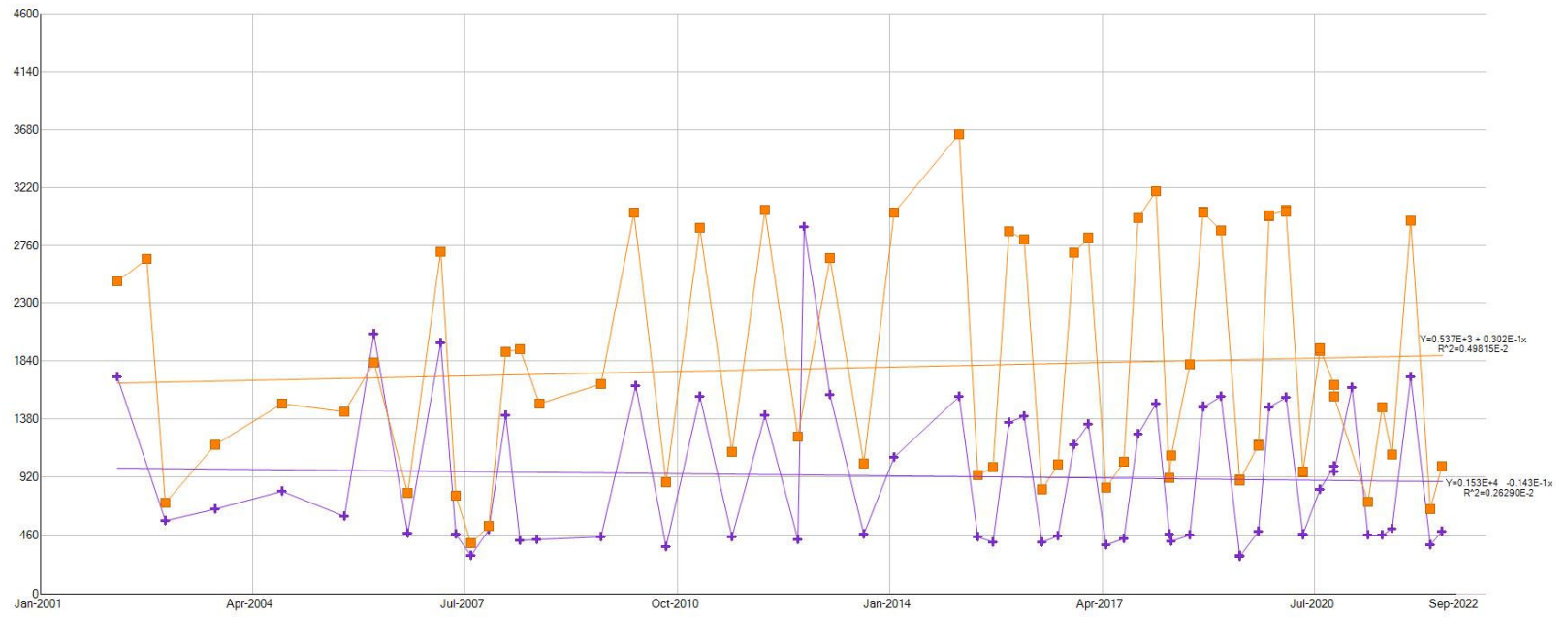
Calcium, dissolved (mg/L)

✦ SW-N1
■ SW-N3



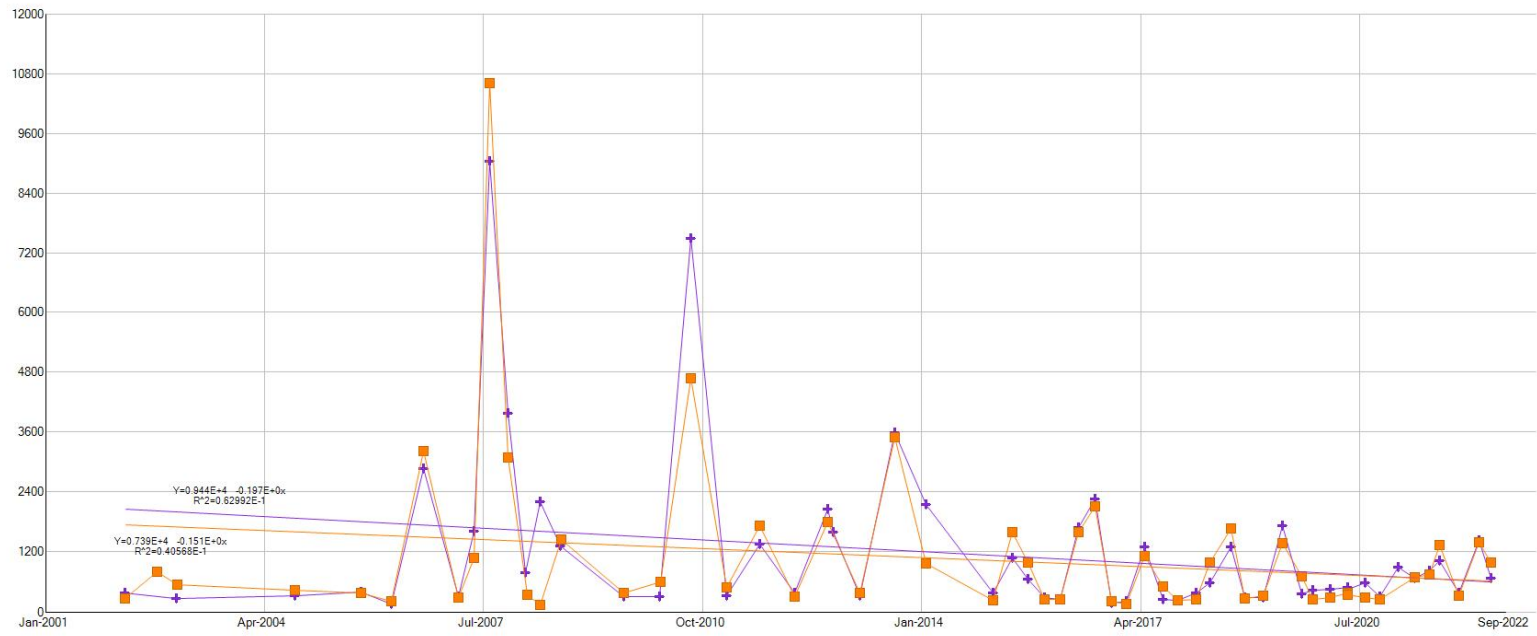
Specific Conductance @ 25C (lab) (umhos/cm)

✦ SW-N1
■ SW-N3



Iron, total recoverable (uq/L)

✦ SW-N1
■ SW-N3

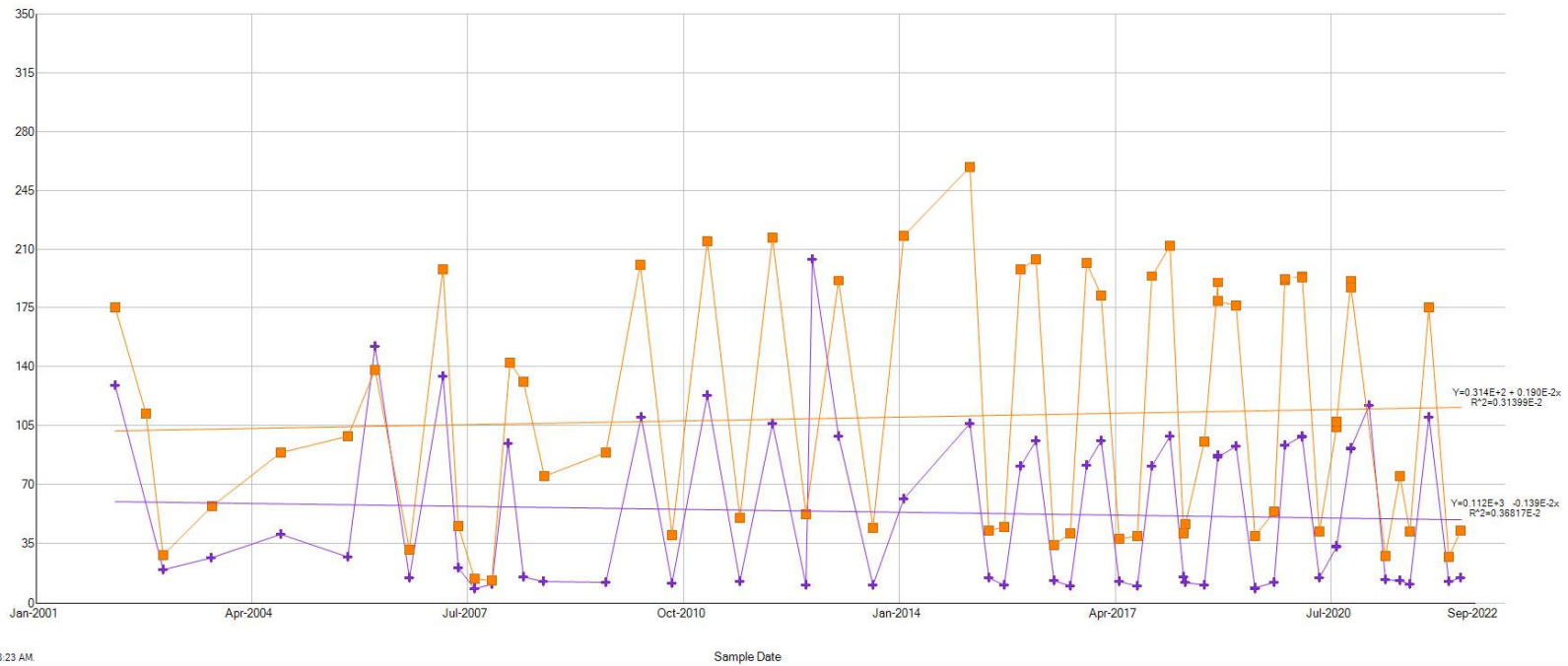


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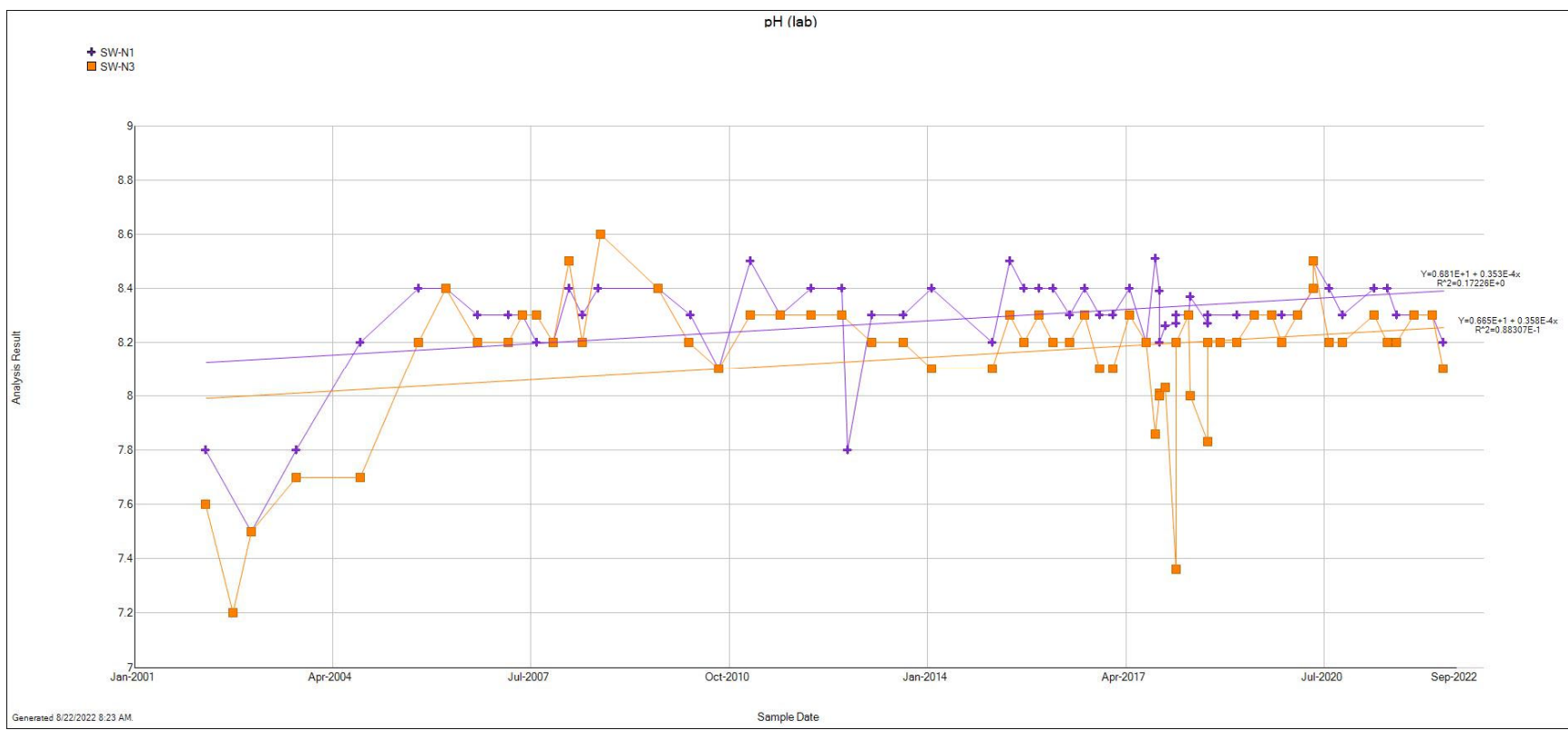
Sample Date

Magnesium, dissolved (mg/L)

✚ SW-N1
■ SW-N3

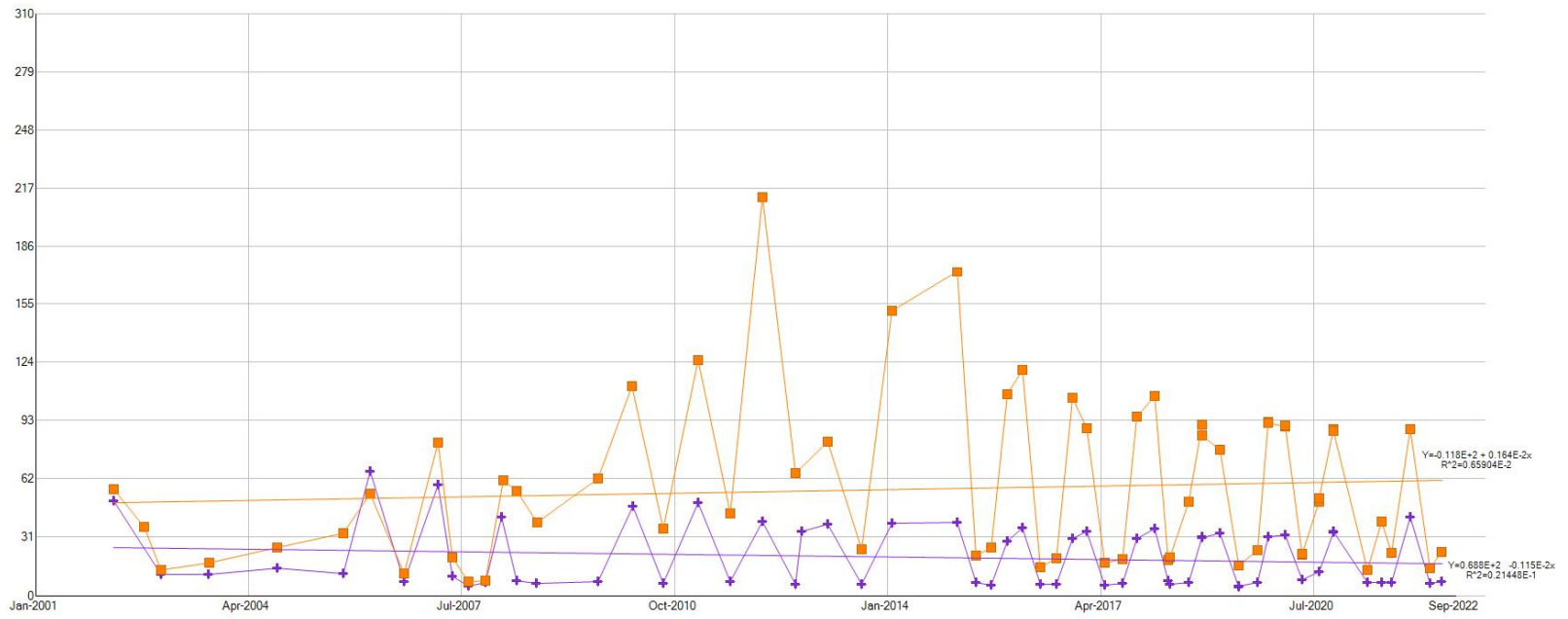


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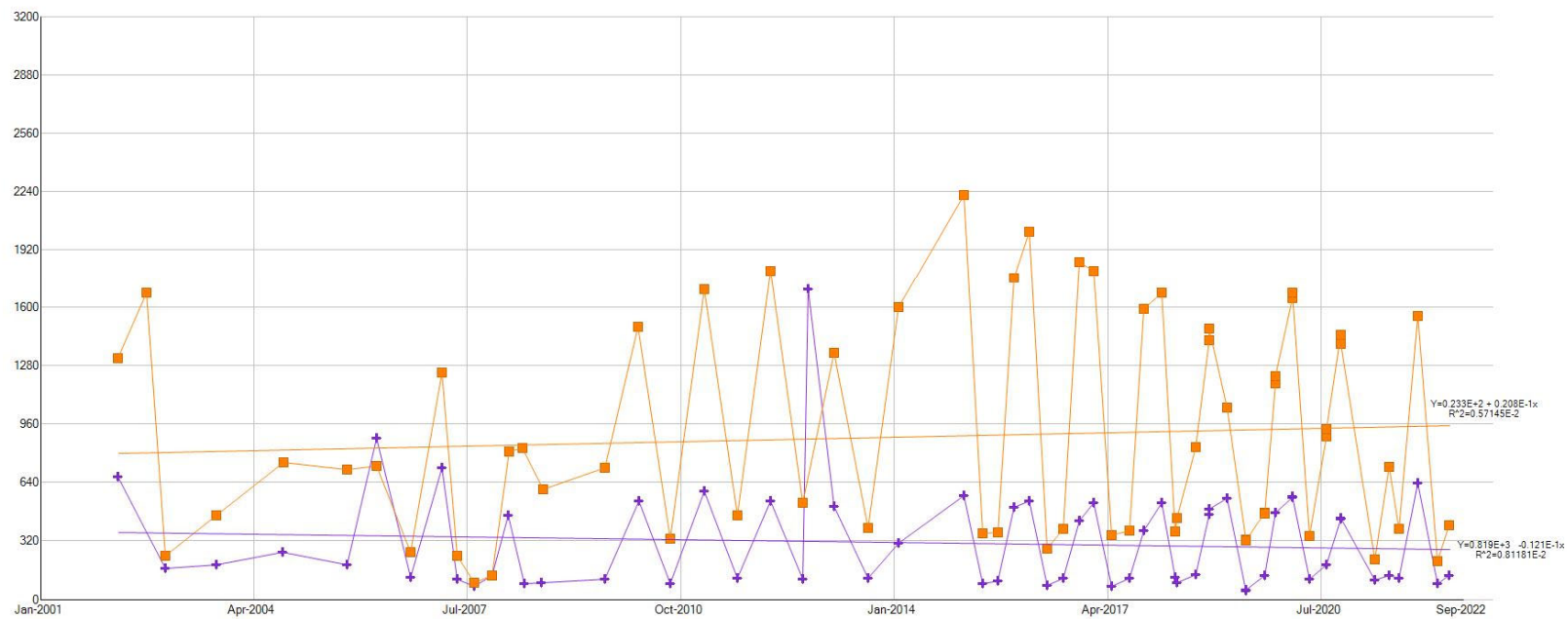
Sodium, dissolved (mg/L)

✚ SW-N1
■ SW-N3



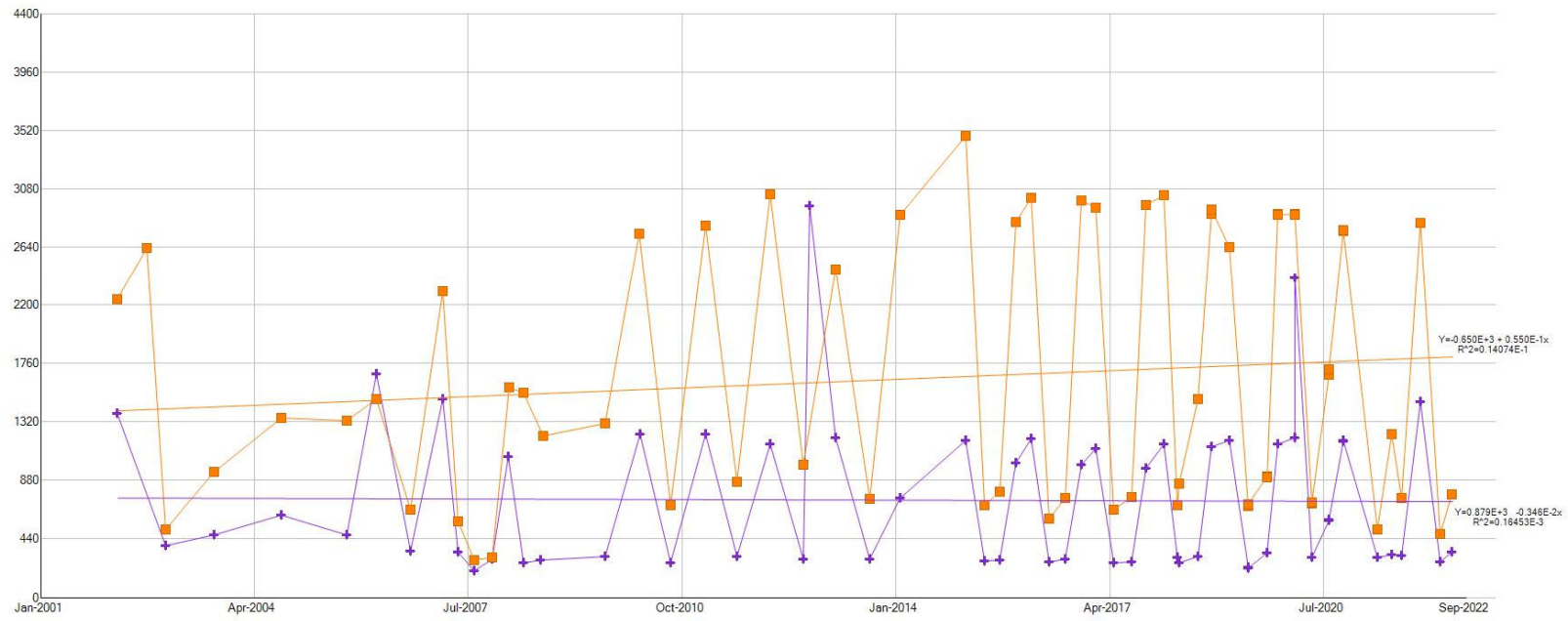
Sulfate, dissolved (mg/L)

+ SW-N1
 ■ SW-N3



Total Dissolved Solids (mg/L)

✦ SW-N1
■ SW-N3



Appendix 3
Groundwater Monitoring Data

New Horizon Mine

Analysis Results by Date (column) and Parameter (row)

Date Range: 10/01/2021 to 09/30/2022

Well: GW-N36

	12/1/2021	3/23/2022	6/21/2022	9/7/2022
Al, diss, mg/L	0.016	<0.0050	0.5	0.31
Alkalinity, lab, mg/L	560	600	38	85
As, diss, mg/L	<0.00020	0.00028	<0.00020	<0.00020
Ca, diss, mg/L	170	190	47	120
Cation-Anion Bal, %	-7.300	-4.500	-4.000	0.000
Cl, diss, mg/L	28	29	12	53
CO3, mg/L	<2.0	<2.0	<2.0	<2.0
Fe, diss, mg/L	0.15	0.043	0.037	0.024
HCO3, mg/L	560	600	38	85
Hg, diss, mg/L	<0.00020	<0.00020	<0.00020	<0.00020
K, diss, mg/L	28	31	3.2	7.7
Mg, diss, mg/L	78	86	18	43
Mn, diss, mg/L	0.12	0.1	0.041	0.12
Mo, diss, mg/L	<0.020	<0.020	<0.020	<0.020
Na, diss, mg/L	84	93	18	39
NH3 as N, diss, mg/L	0.71	0.95	<0.050	0.082
NO2, diss, mg/L	0.11	0.054	0.56	3.1
NO3, diss, mg/L	<0.010	<0.010	<0.010	<0.010
Orthophosphate, diss, mg/l	0.11	0.054	0.56	3.1
Pb, diss, mg/L	<0.030	0.018	0.034	0.056
pH (field), pH	0.00016	<0.00010	0.00047	0.0014
pH (lab), pH	7.1	6.9	5.3	5.9
Se, diss, mg/L	8	7.6	6.8	6.7
SO4, diss, mg/L	<0.00010	<0.00010	0.0016	0.0027
Spec. Cond. (field), umhos/cm	1752	1875	464	1038
Spec. Cond. (lab), umhos/cm	1740	1800	494	1040
TDS, mg/L	1300	1300	370	760
Temp (Celcius), degrees C	13.7	12.8	14.6	17.4
Zinc, diss, mg/l	<0.020	<0.020	0.043	0.16

New Horizon Mine**Analysis Results by Date (column) and Parameter (row)****Date Range: 10/01/2021 to 09/30/2022****Well: GW-N37**

	12/1/2022	3/23/2022	6/21/2021	9/7/2022
Al, diss, mg/L	Dry	Dry	0.68	2.1
Alkalinity, lab, mg/L			<2.0	<2.0
As, diss, mg/L			<0.00020	<0.00020
Ca, diss, mg/L			39	90
Cation-Anion Bal, %			-3.700	3.000
Cl, diss, mg/L			12	57
CO3, mg/L			<2.0	<2.0
Fe, diss, mg/L			0.027	0.098
HCO3, mg/L			<2.0	<2.0
Hg, diss, mg/L			<0.00020	<0.00020
K, diss, mg/L			1.2	1.8
Mg, diss, mg/L			14	32
Mn, diss, mg/L			0.012	0.025
Mo, diss, mg/L			<0.020	<0.020
Na, diss, mg/L			16	25
NH3 as N, diss, mg/L			<0.050	<0.050
NO2, diss, mg/L			<0.010	<0.010
NO3, diss, mg/L			0.58	4
Orthophosphate, diss, mg/l			0.043	0.059
Pb, diss, mg/L			0.0011	0.011
pH (field), pH			4.5	4.1
pH (lab), pH			5.5	4.9
Se, diss, mg/L			0.0018	0.0031
SO4, diss, mg/L			180	290
Spec. Cond. (field),			444	838
Spec. Cond. (lab), umhos/cm			435	848
TDS, mg/L			310	610
Temp (Celcius), degrees C			13.9	18.7
Zinc, diss, mg/l			0.037	0.23

New Horizon Mine

Analysis Results by Date (column) and Parameter (row)

Date Range: 10/01/2021 to 09/30/2022

Well: GW-N38

	12/1/2021	3/23/2022	6/21/2021	9/7/2022
Al, diss, mg/L	Dry	Dry	Dry	Dry
Alkalinity, lab, mg/L				
As, TD, mg/L				
Ca, diss, mg/L				
Cation-Anion Bal, %				
Cl, diss, mg/L				
CO3, mg/L				
Fe, diss, mg/L				
Fe, tot rec, ug/L				
HCO3, mg/L				
Hg, diss, mg/L				
K, diss, mg/L				
Mg, diss, mg/L				
Mn, TD, mg/L				
Mo, diss, mg/L				
Na, diss, mg/L				
NH3 as N, diss, mg/L				
NO2 + NO3, diss, mg/L				
NO2, diss, mg/L				
NO3, diss, mg/L				
pH (field), pH				
pH (lab), pH				
Se, TD, mg/L				
SO4, diss, mg/L				
Spec. Cond. (field), umhos/cm				
Spec. Cond. (lab), umhos/cm				
TDS, mg/L				
Temp (Celcius), degrees C				
Temp (Celcius), degrees C				
Zn, TD, mg/L				

New Horizon Mine**Analysis Results by Date (column) and Parameter (row)****Date Range: 10/01/2021 to 09/30/2022****Well: GW-N44**

	12/1/2021	3/23/2022	6/1/2022	9/7/2022
Al, diss, mg/L	<0.0050	<0.0050	<0.0050	0.0086
Alkalinity, lab, mg/L	380	400	350	370
As, diss, mg/L	0.00020	<0.00020	<0.00020	<0.00020
Ca, diss, mg/L	260	300	260	290
Cation-Anion Bal, %	-4.500	0.000	-4.500	-2.000
Cl, diss, mg/L	7.9	8.0	8.2	8.8
CO3, mg/L	<2.0	<2.0	<2.0	<2.0
Fe, diss, mg/L	0.011	0.020	<0.0070	0.0076
HCO3, mg/L	380	400	350	370
Hg, diss, mg/L	<0.00020	<0.00020	<0.00020	<0.00020
K, diss, mg/L	2.0	1.8	2.1	1.8
Mg, diss, mg/L	82	92	83	100
Mn, diss, mg/L	<0.010	<0.010	<0.010	<0.010
Mo, diss, mg/L	<0.020	<0.020	<0.020	<0.020
Na, diss, mg/L	29	29	32	39
NH3 as N, diss, mg/L	<0.050	<0.050	0.22	<0.050
NO2, diss, mg/L	<0.010	<0.010	<0.010	<0.010
NO3, diss, mg/L	0.082	0.081	0.14	0.12
Orthophosphate, diss, mg/l	<0.030	<0.010	0.090	0.034
Pb, diss, mg/L	0.00017	<0.00010	<0.00010	0.00013
pH (field), pH	7.4	7.3	7.4	7.3
pH (lab), pH	8.1	8	8.2	7.6
Se, diss, mg/L	0.0032	0.0026	0.0030	0.0036
SO4, diss, mg/L	710	770	760	840
Spec. Cond. (field), umhos/cm	2159	1805	1640	1871
Spec. Cond. (lab), umhos/cm	1790	1770	1730	1880
TDS, mg/L	1500	1500	1400	1600
Temp (Celcius), degrees C	10.2	9	9.1	11.5
Zinc, diss, mg/l	<0.020	<0.020	<0.020	0.12

New Horizon Mine

Analysis Results by Date (column) and Parameter (row)

Date Range: 10/01/2021 to 09/30/2022

Well: GW-N45

	12/1/2021	3/23/2022	6/1/2022	9/7/2022
Al, diss, mg/L	0.013	<0.010	<0.010	0.0095
Alkalinity, lab, mg/L	1300	1300	1300	1200
As, diss, mg/L	0.0012	0.0015	0.0021	0.0021
Ca, diss, mg/L	19	35	27	26
Cation-Anion Bal, %	-5.200	-2.300	-3.500	-1.900
Cl, diss, mg/L	53	69	68	80
CO3, mg/L	140	93	150	28
Fe, diss, mg/L	0.049	0.038	0.034	0.016
HCO3, mg/L	1200	1200	1100	1200
Hg, diss, mg/L	<0.00020	<0.00020	<0.00020	<0.00020
K, diss, mg/L	7.0	8.6	8.5	7.9
Mg, diss, mg/L	160	290	230	210
Mn, diss, mg/L	0.13	0.22	0.17	0.17
Mo, diss, mg/L	<0.040	<0.040	<0.040	<0.040
Na, diss, mg/L	720	850	800	770
NH3 as N, diss, mg/L	1.1	1.4	1.1	0.93
NO2, diss, mg/L	<0.010	<0.010	<0.010	0.022
NO3, diss, mg/L	<0.20	<0.40	<0.020	<0.020
Orthophosphate, diss, mg/l	0.26	0.10	0.32	0.26
Pb, diss, mg/L	0.00027	<0.00020	0.00023	0.00018
pH (field), pH	8	8.1	8	8.1
pH (lab), pH	8.7	8.5	8.7	8.3
Se, diss, mg/L	0.064	0.026	0.0088	0.081
SO4, diss, mg/L	1100	1900	1500	1300
Spec. Cond. (field), umhos/cm	3957	4881	4413	4023
Spec. Cond. (lab), umhos/cm	4020	4860	4540	4150
TDS, mg/L	3000	3800	3500	3000
Temp (Celcius), degrees C	11.1	10.3	12	13.2
Zinc, diss, mg/l	<0.040	<0.040	<0.040	0.061

New Horizon Mine

Analysis Results by Date (column) and Parameter (row)

Date Range: 10/01/2020 to 09/30/2021

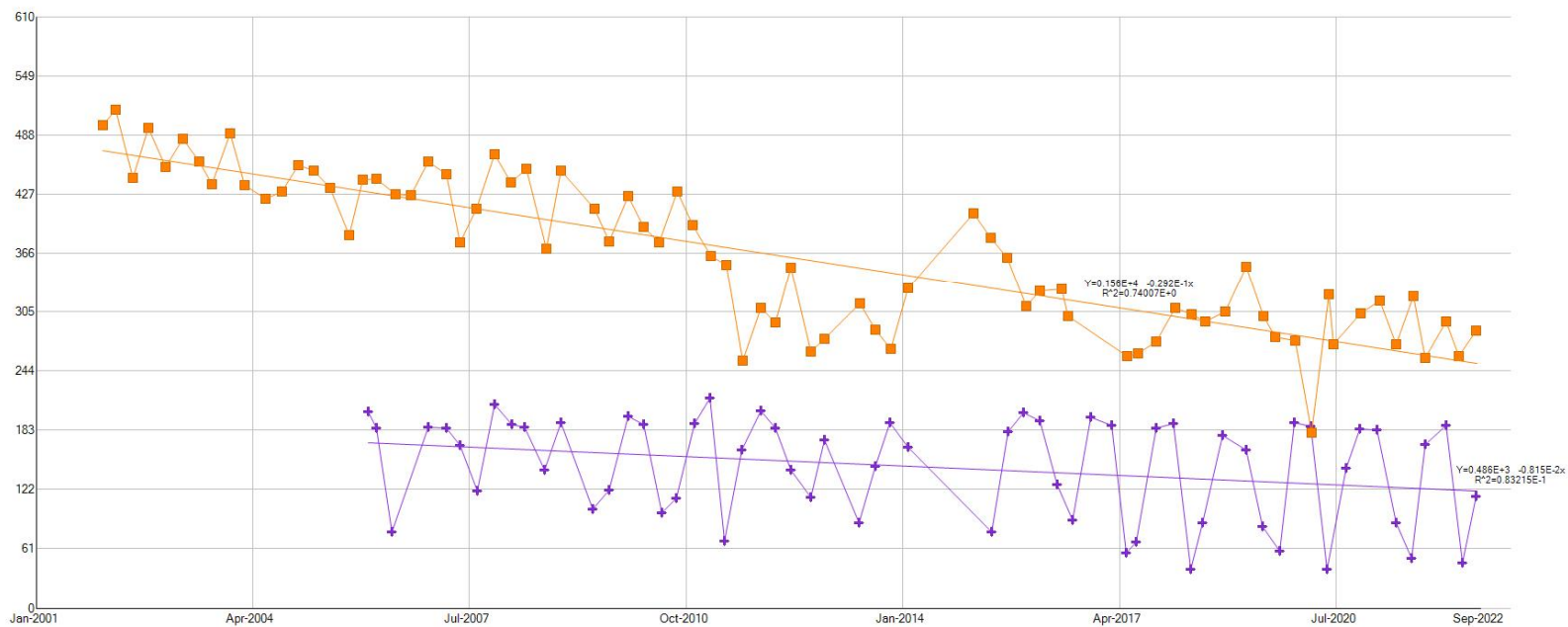
Well: GW-N46

	12/1/2021	3/23/2022	6/1/2022	9/7/2022
Al, diss, mg/L	0.036	0.026	0.071	0.066
Alkalinity, lab, mg/L	980	990	930	930
As, diss, mg/L	0.0020	0.0029	0.0029	0.0017
Ca, diss, mg/L	12	13	13	10
Cation-Anion Bal, %	-5.900	-4.200	-4.200	-1.500
Cl, diss, mg/L	70	45	43	44
CO3, mg/L	81	61	64	<2.0
Fe, diss, mg/L	0.041	0.031	0.12	0.069
HCO3, mg/L	900	930	870	930
Hg, diss, mg/L	<0.00020	<0.00020	<0.00020	<0.00020
K, diss, mg/L	8.9	9.3	9.7	8.8
Mg, diss, mg/L	8.2	8.8	9.1	6.3
Mn, diss, mg/L	<0.020	0.15	0.049	<0.020
Mo, diss, mg/L	<0.040	<0.040	<0.040	<0.040
Na, diss, mg/L	680	730	730	720
NH3 as N, diss, mg/L	0.89	1.2	1.1	0.68
NO2, diss, mg/L	0.15	0.078	0.082	0.023
NO3, diss, mg/L	0.19	0.41	0.38	0.11
Orthophosphate, diss, mg/l	0.18	0.14	0.55	0.16
Pb, diss, mg/L	0.00033	0.00025	0.00068	0.00093
pH (field), pH	8	8.1	8.1	8
pH (lab), pH	8.6	8.5	8.6	8.2
Se, diss, mg/L	0.0011	0.0020	0.00069	<0.00020
SO4, diss, mg/L	700	740	800	700
Spec. Cond. (field), umhos/cm	3217	3220	3101	3041
Spec. Cond. (lab), umhos/cm	3180	3110	3200	3120
TDS, mg/L	2300	2100	2200	2000
Temp (Celcius), degrees C	10.5	10.6	12	12.7
Zinc, diss, mg/l	<0.040	<0.040	<0.040	<0.040

Appendix 4
Groundwater Monitoring Graphs

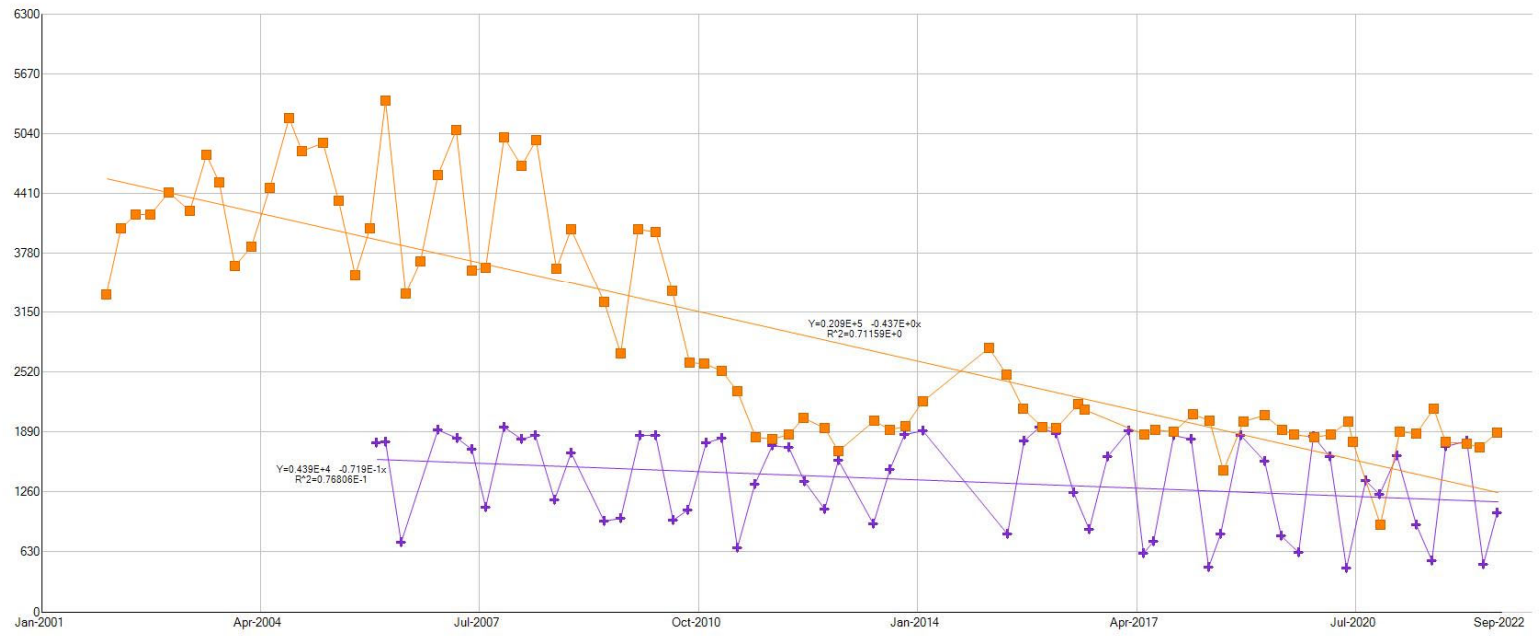
Calcium, dissolved (mg/L)

+ GW-N36
 ■ GW-N44



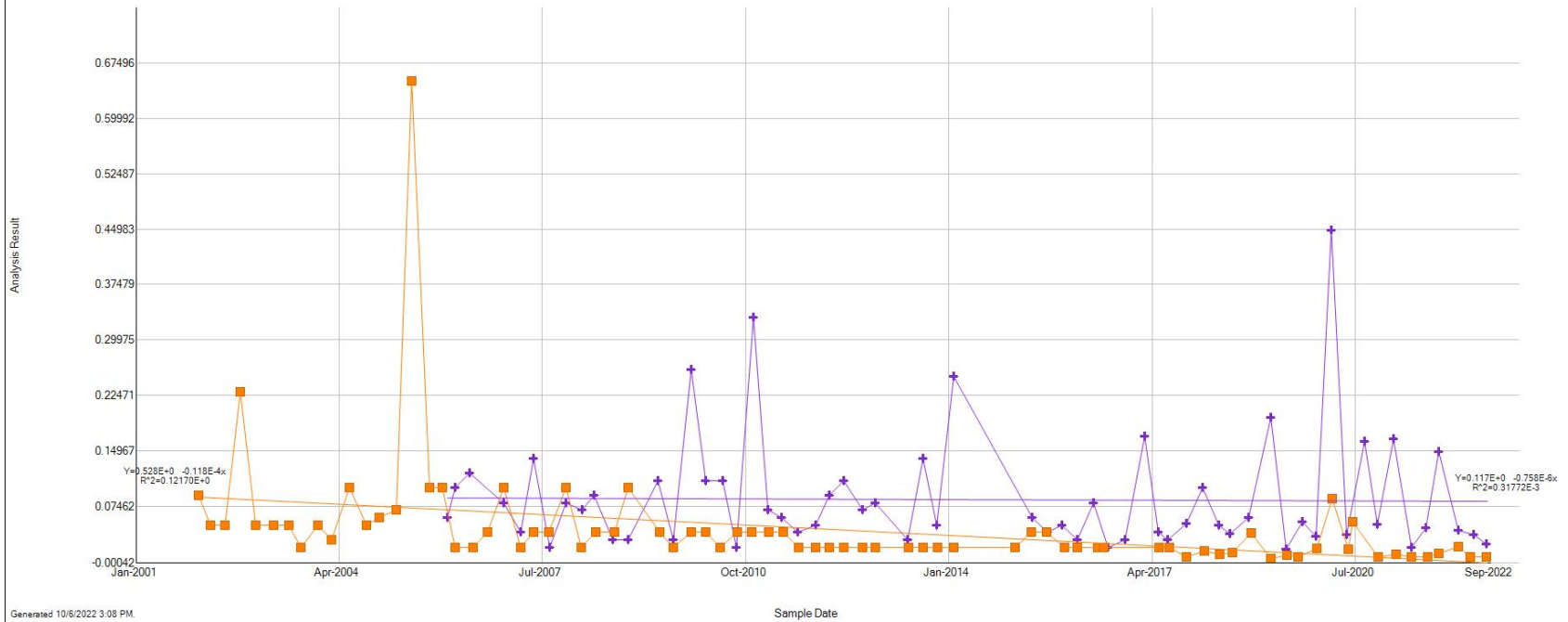
Specific Conductance @ 25C (lab) (umhos/cm)

✦ GW-N36
■ GW-N44



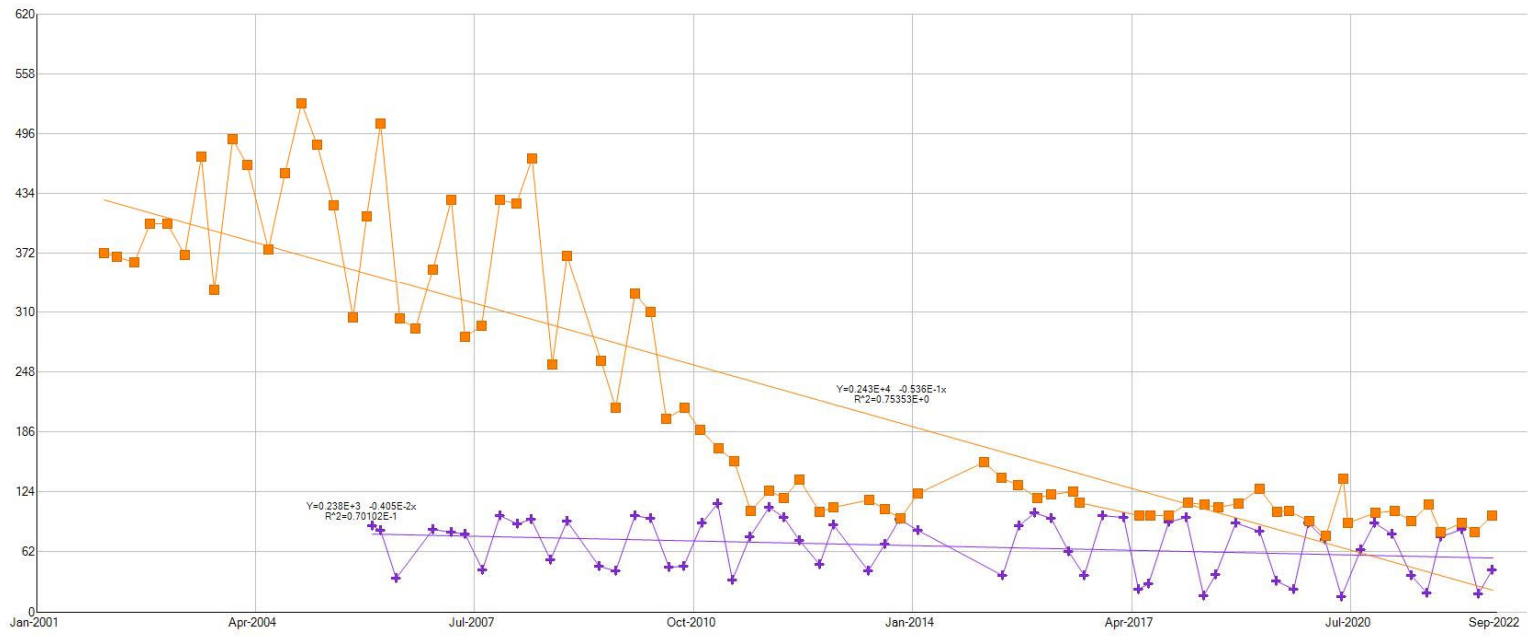
Iron, dissolved (mg/L)

✦ GW-N36
■ GW-N44



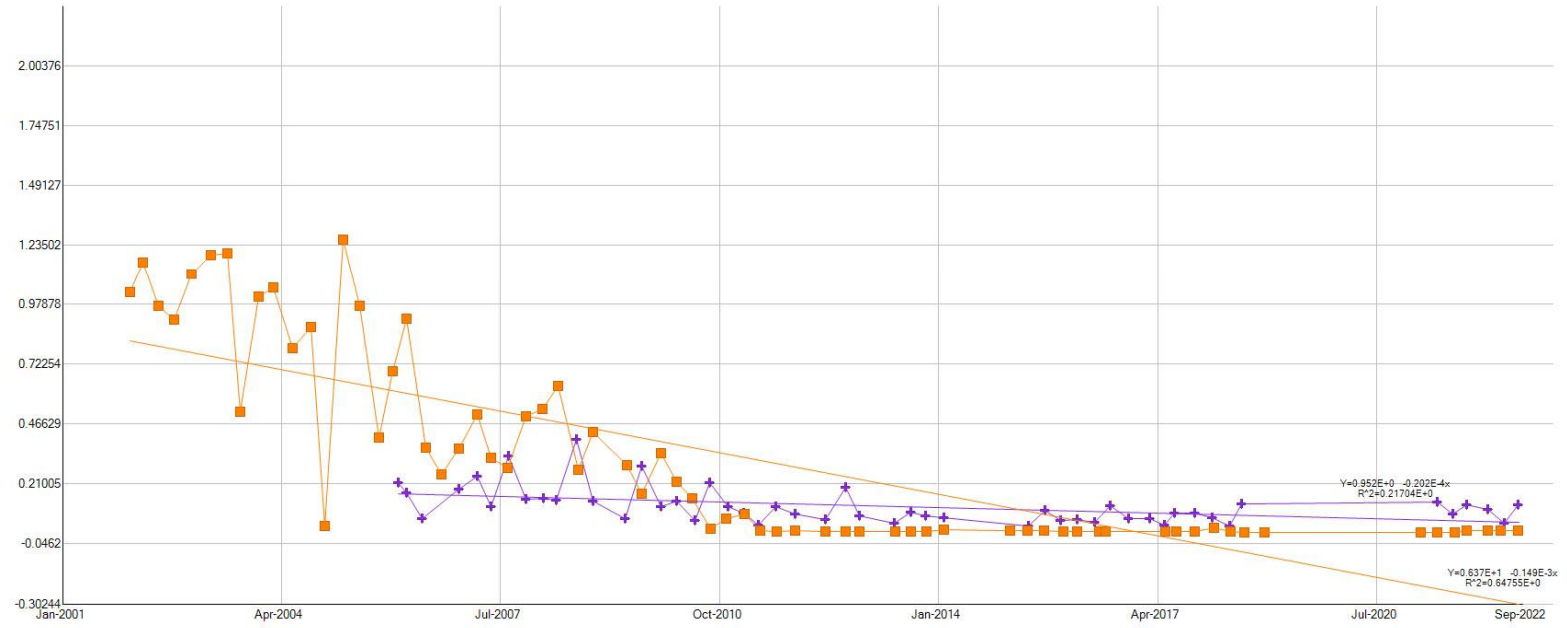
Magnesium, dissolved (mg/L)

✦ GW-N36
■ GW-N44



Manganese, dissolved (mg/L)

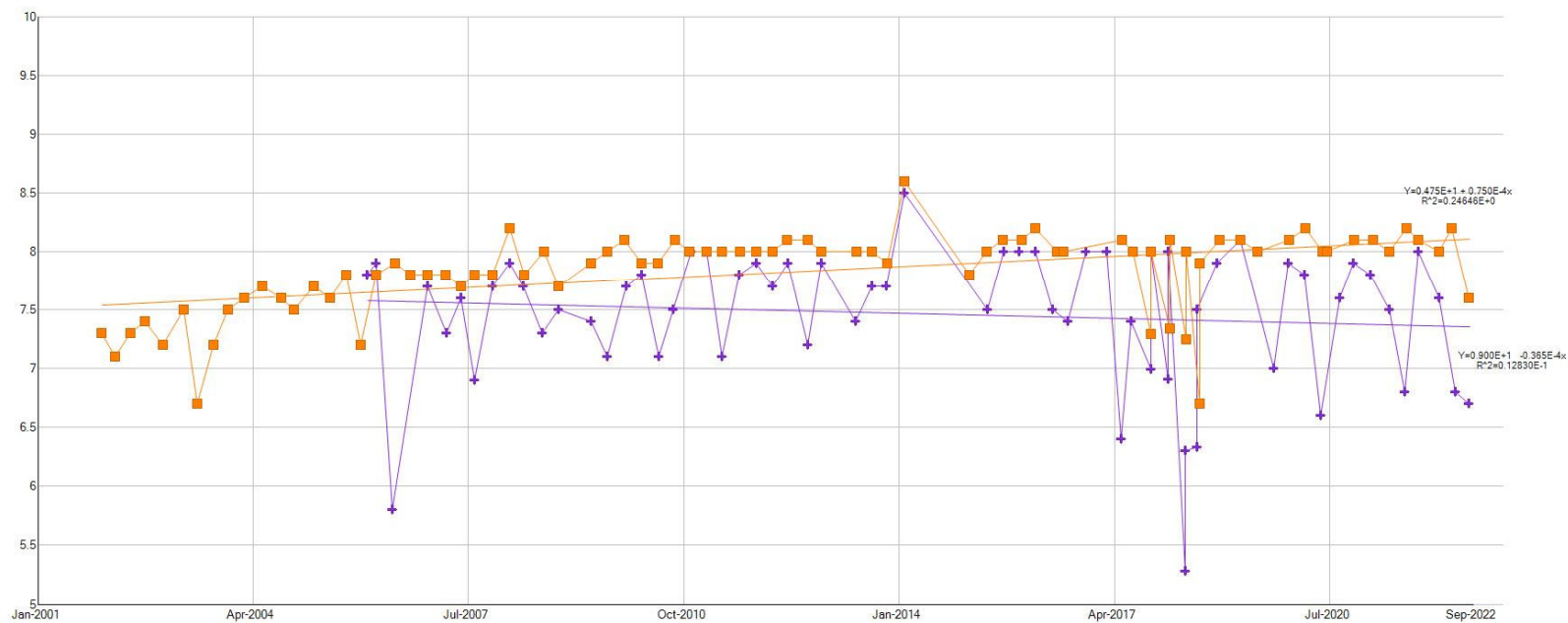
✦ GW-N36
■ GW-N44



pH (lab)

✚ GW-N36
■ GW-N44

Analysis Result

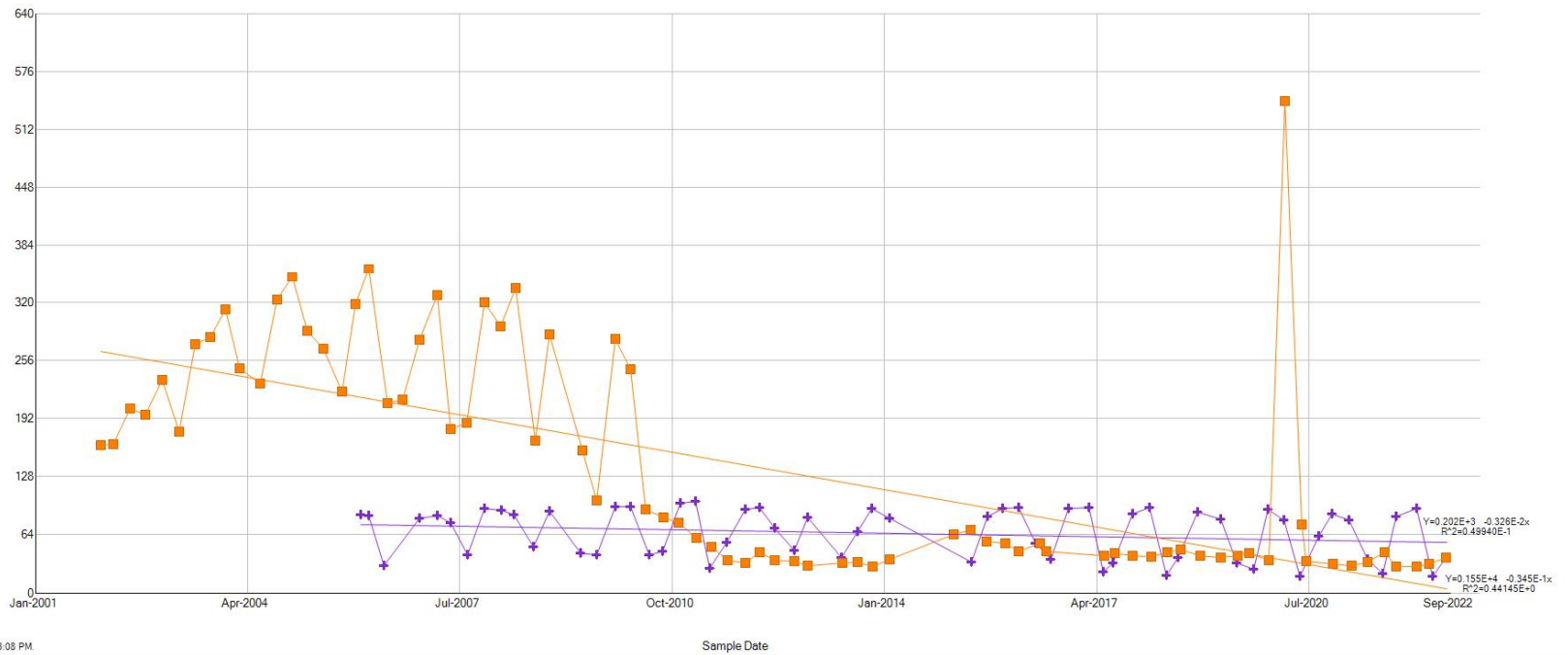


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Sample Date

Sodium, dissolved (mg/L)

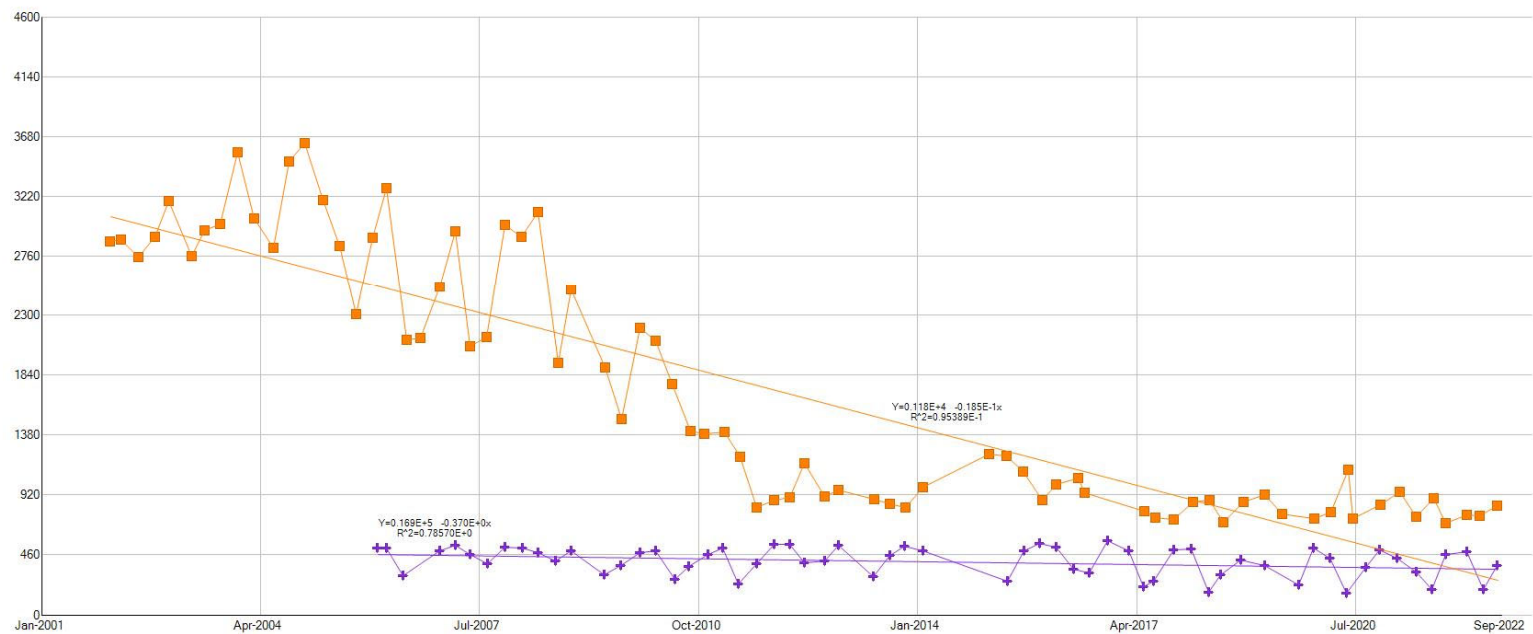
✦ GW-N36
■ GW-N44



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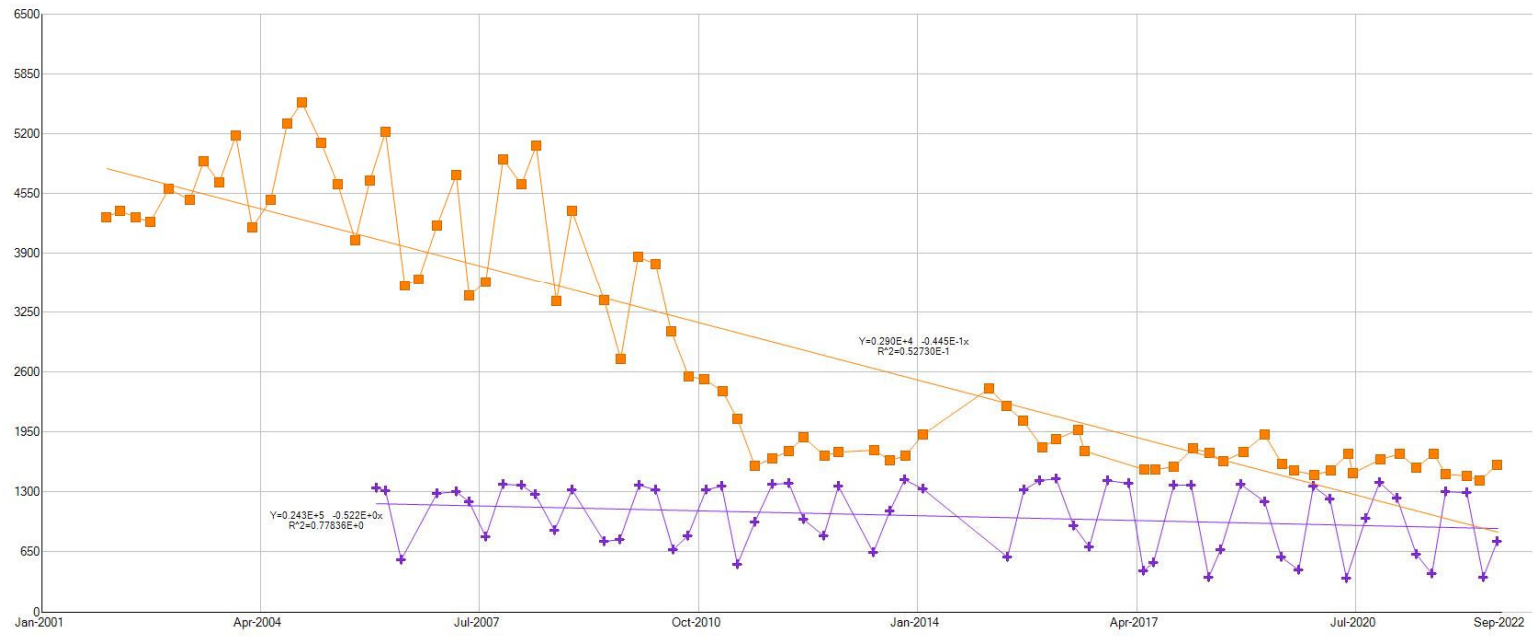
Sulfate, dissolved (mg/L)

✚ GW-N36
■ GW-N44



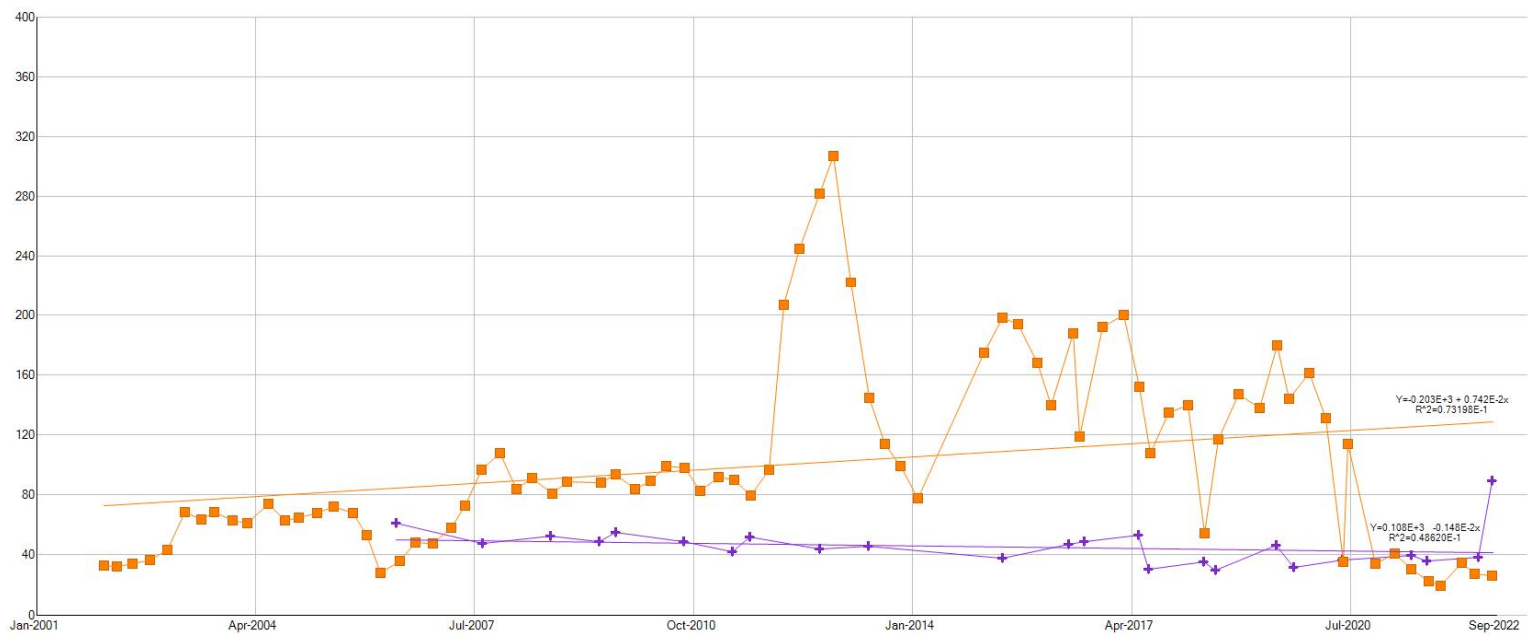
Total Dissolved Solids (mg/L)

✦ GW-N36
■ GW-N44



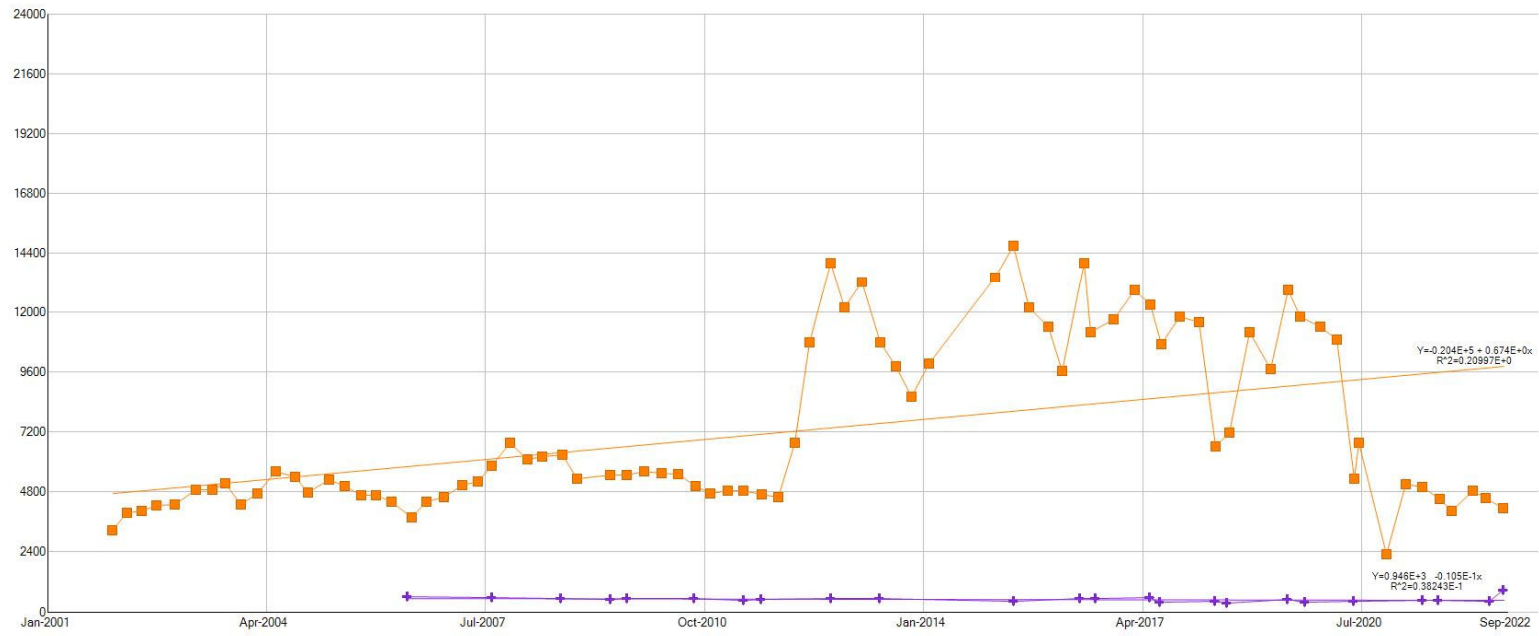
Calcium, dissolved (mg/L)

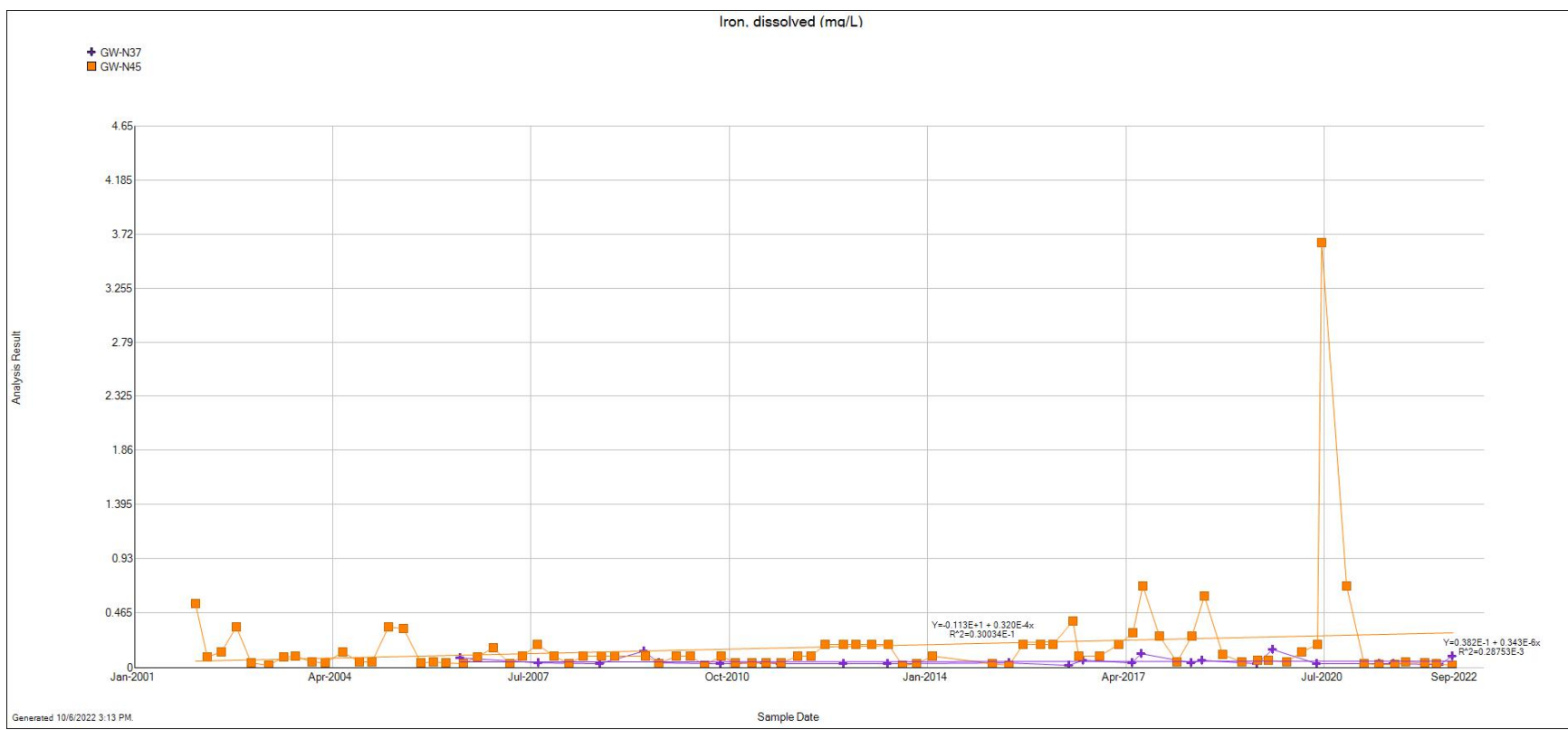
✦ GW-N37
■ GW-N45



Specific Conductance @ 25C (lab) (umhos/cm)

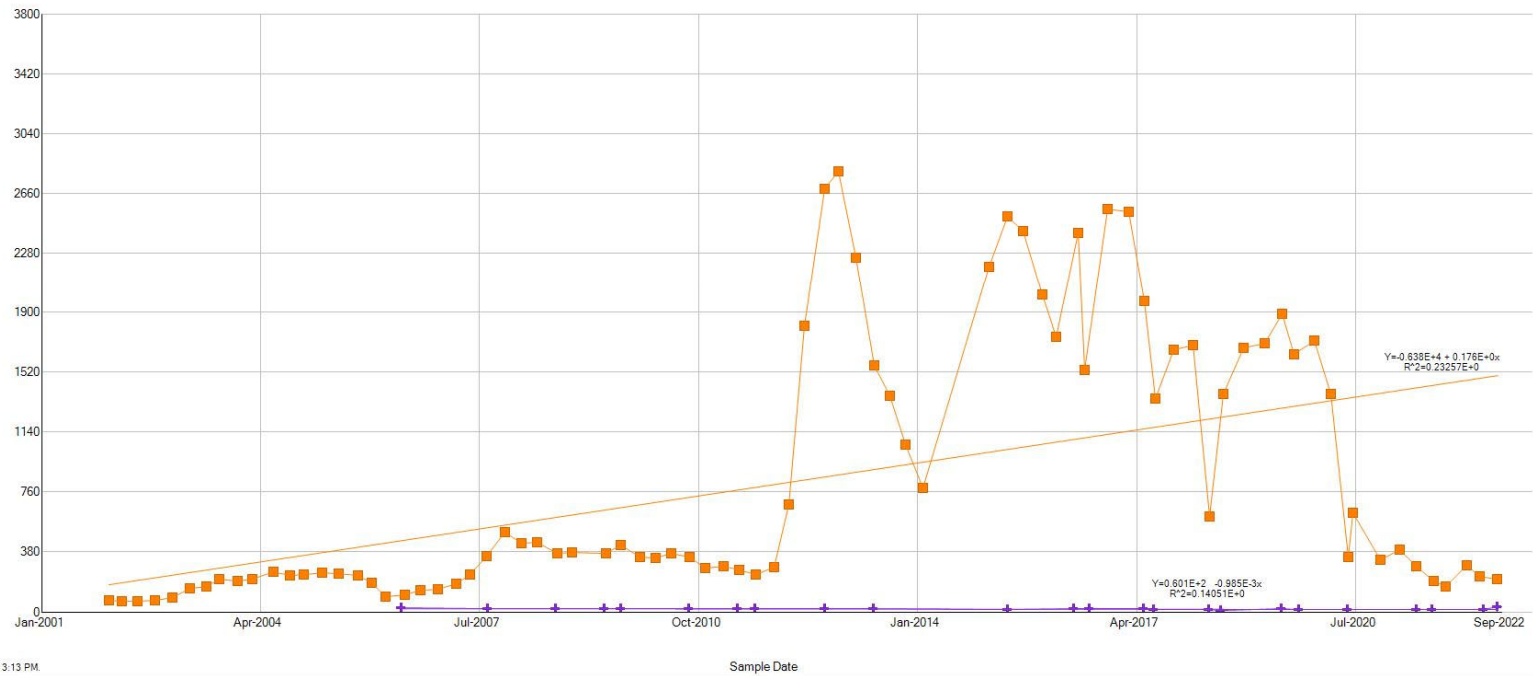
✦ GW-N37
■ GW-N45





Magnesium, dissolved (mg/L)

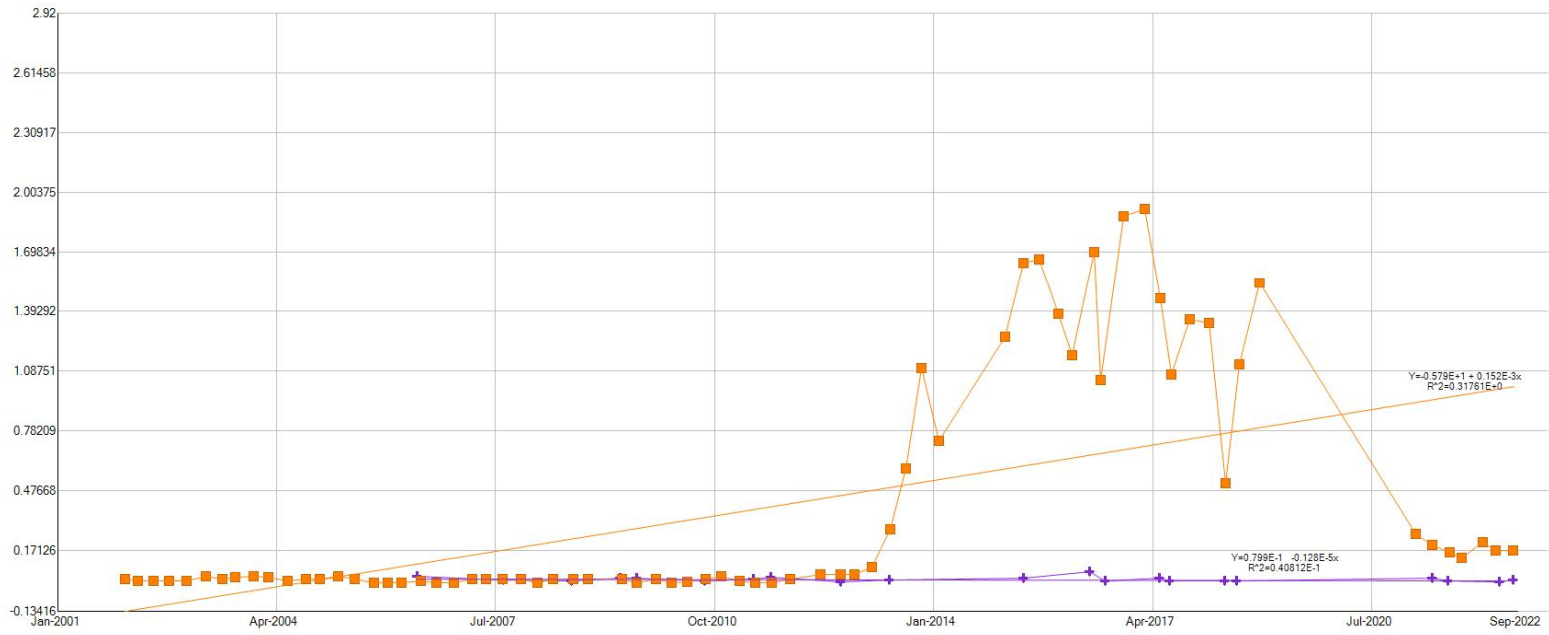
✚ GW-N37
■ GW-N45



Manganese, dissolved (mg/L)

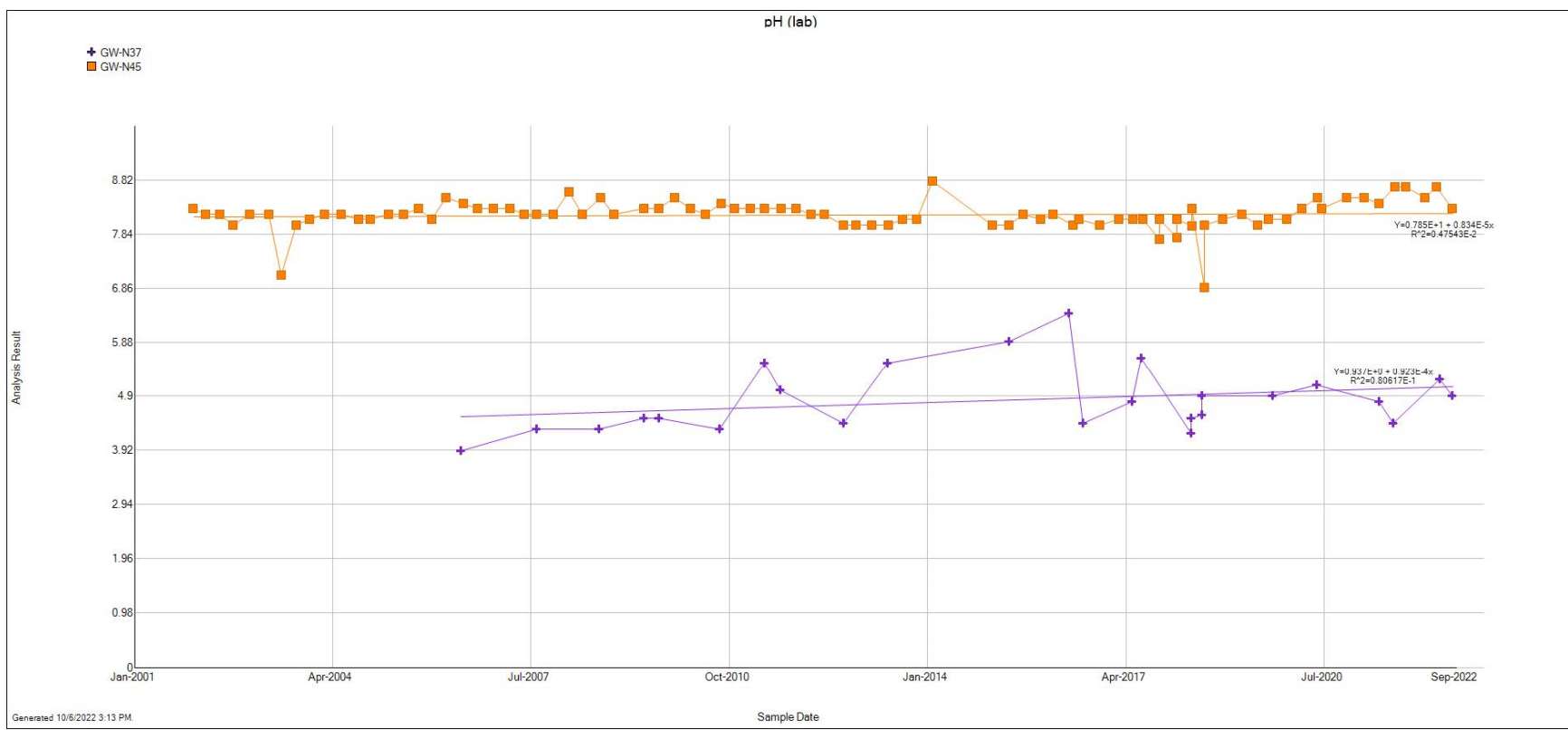
✚ GW-N37
■ GW-N45

Analysis Result



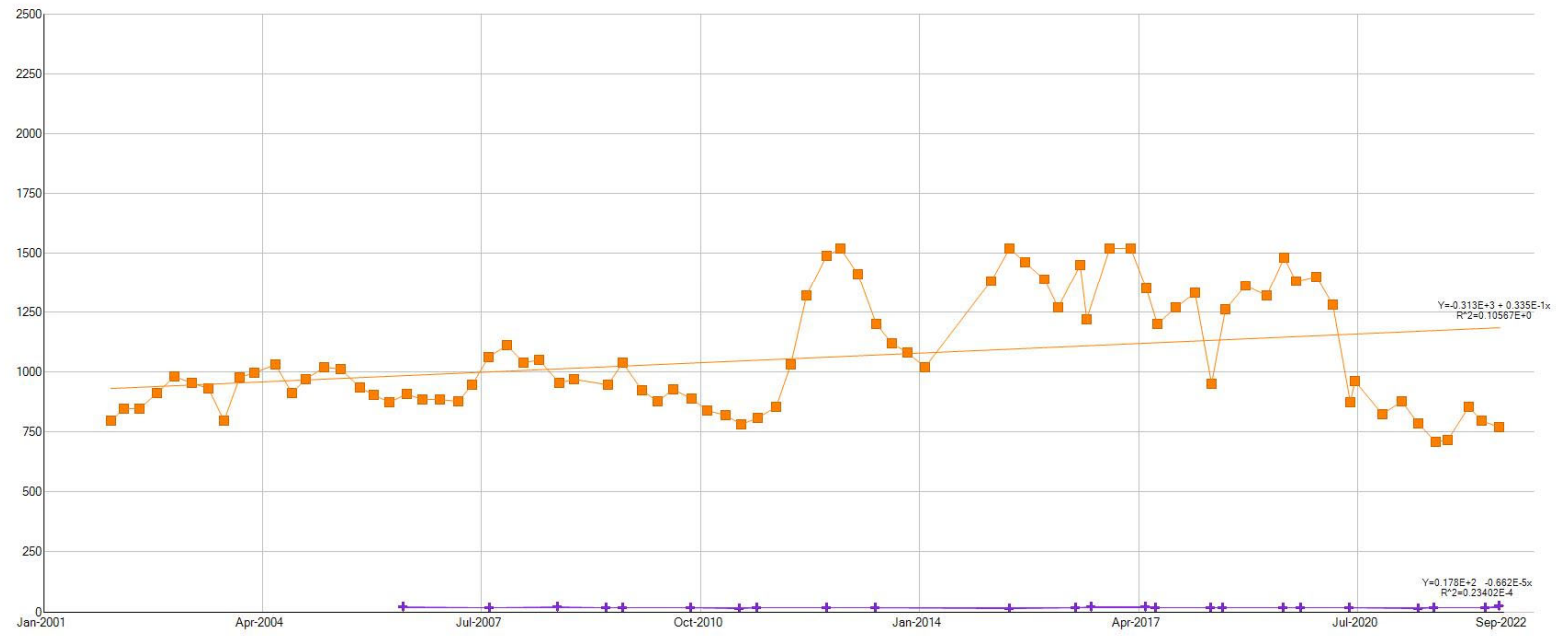
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Sample Date



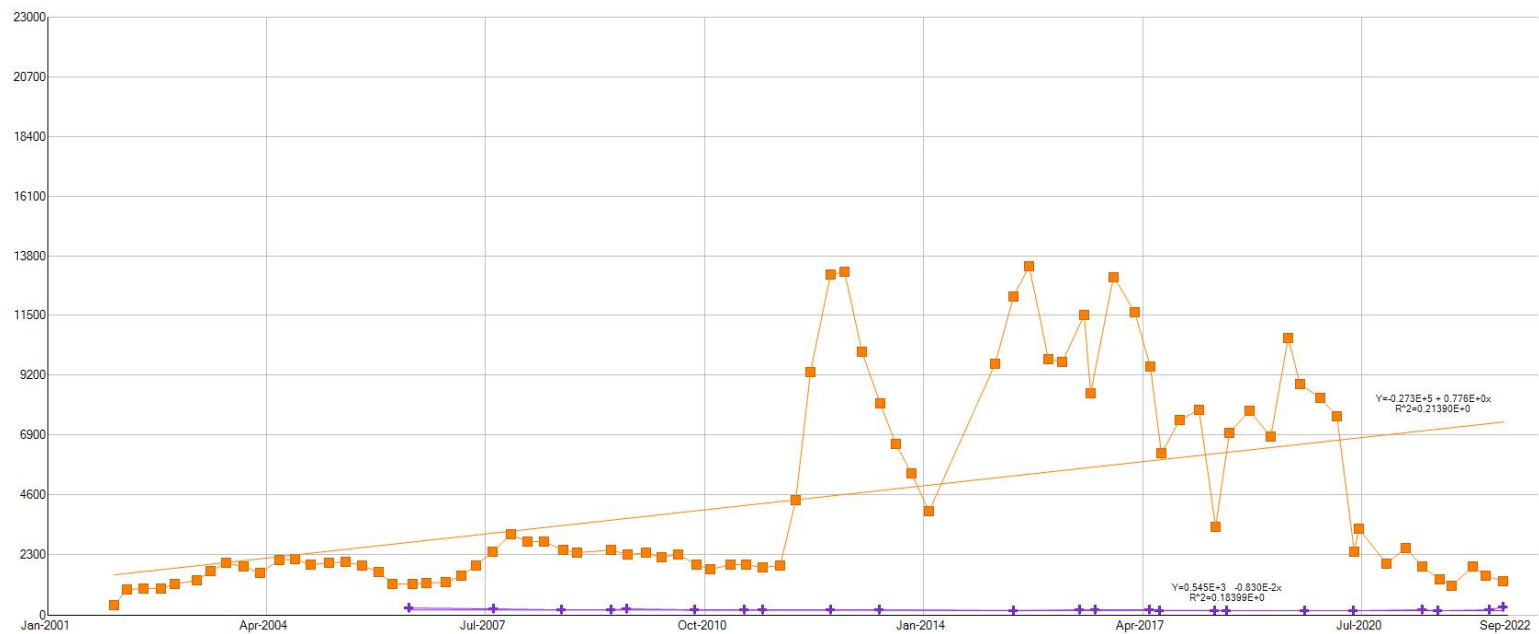
Sodium, dissolved (mg/L)

✚ GW-N37
■ GW-N45



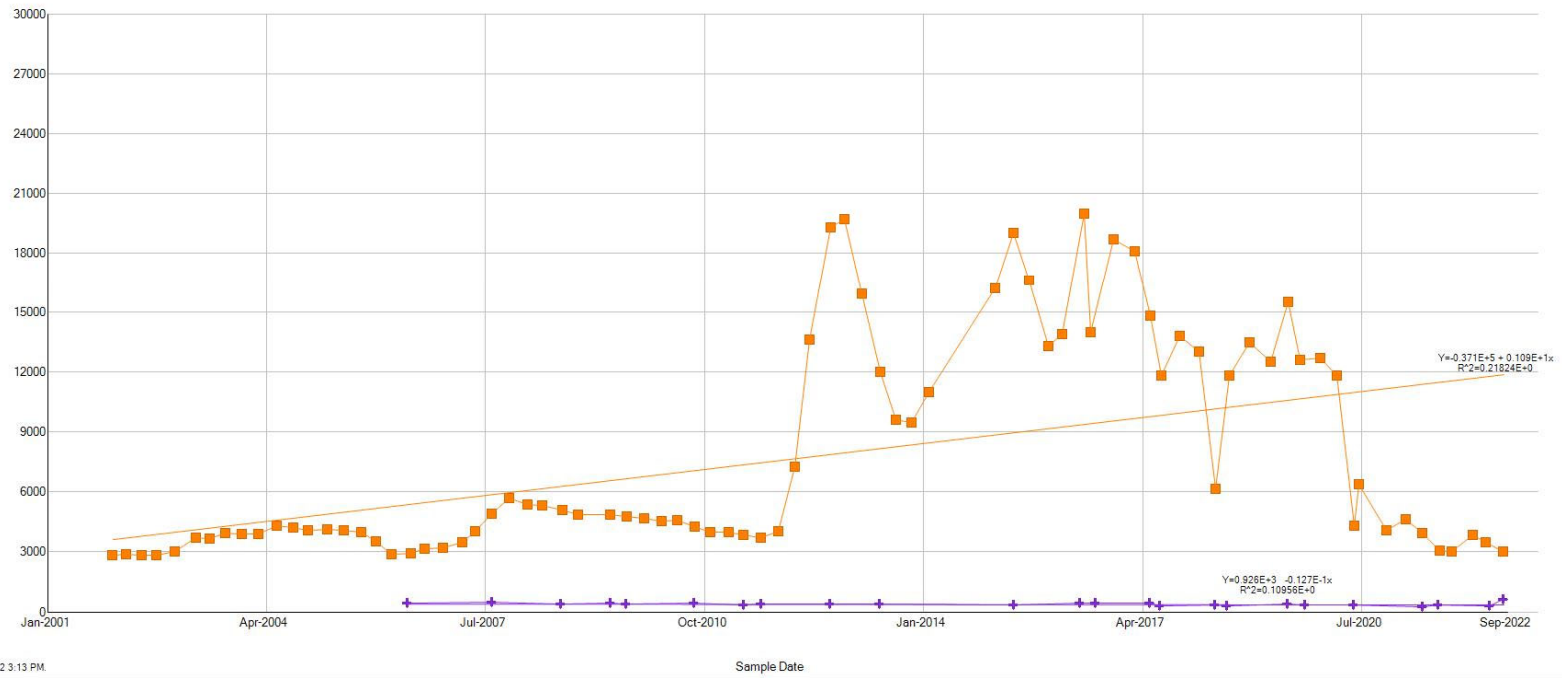
Sulfate, dissolved (mg/L)

+ GW-N37
 ■ GW-N45



Total Dissolved Solids (mg/L)

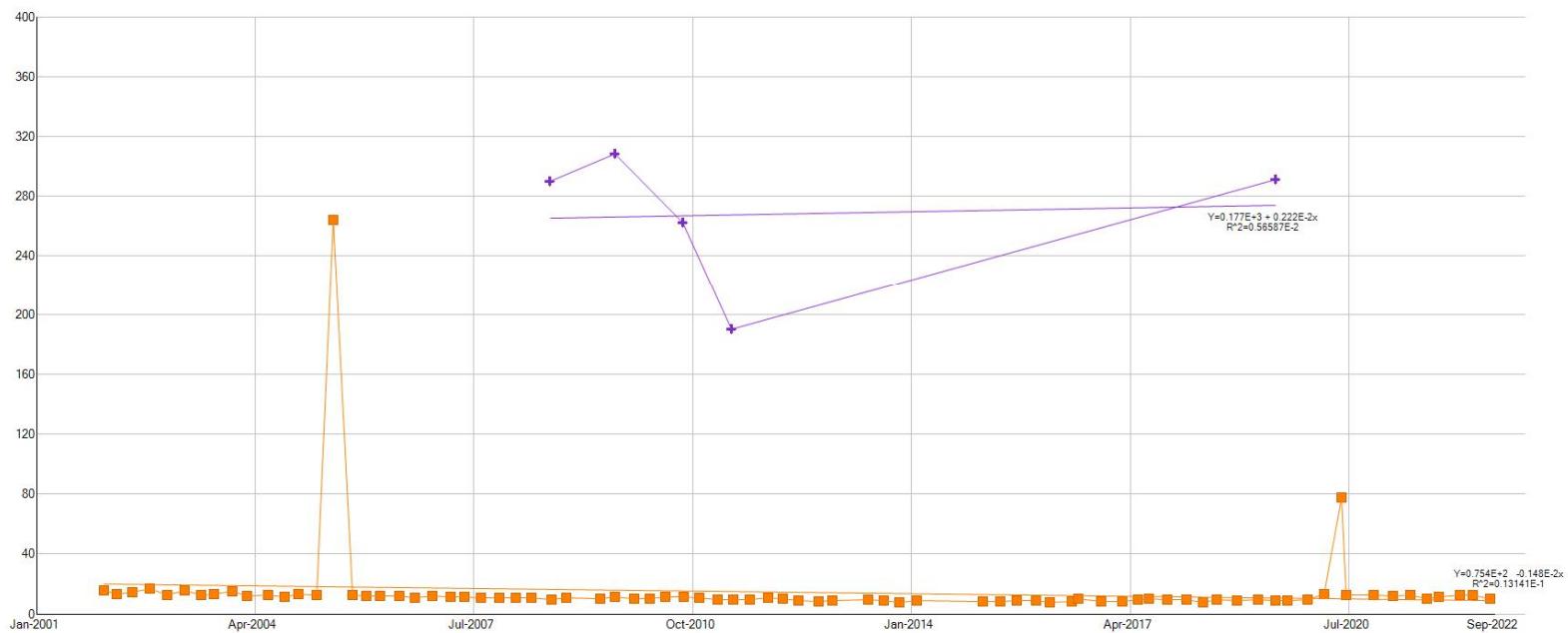
✚ GW-N37
■ GW-N45



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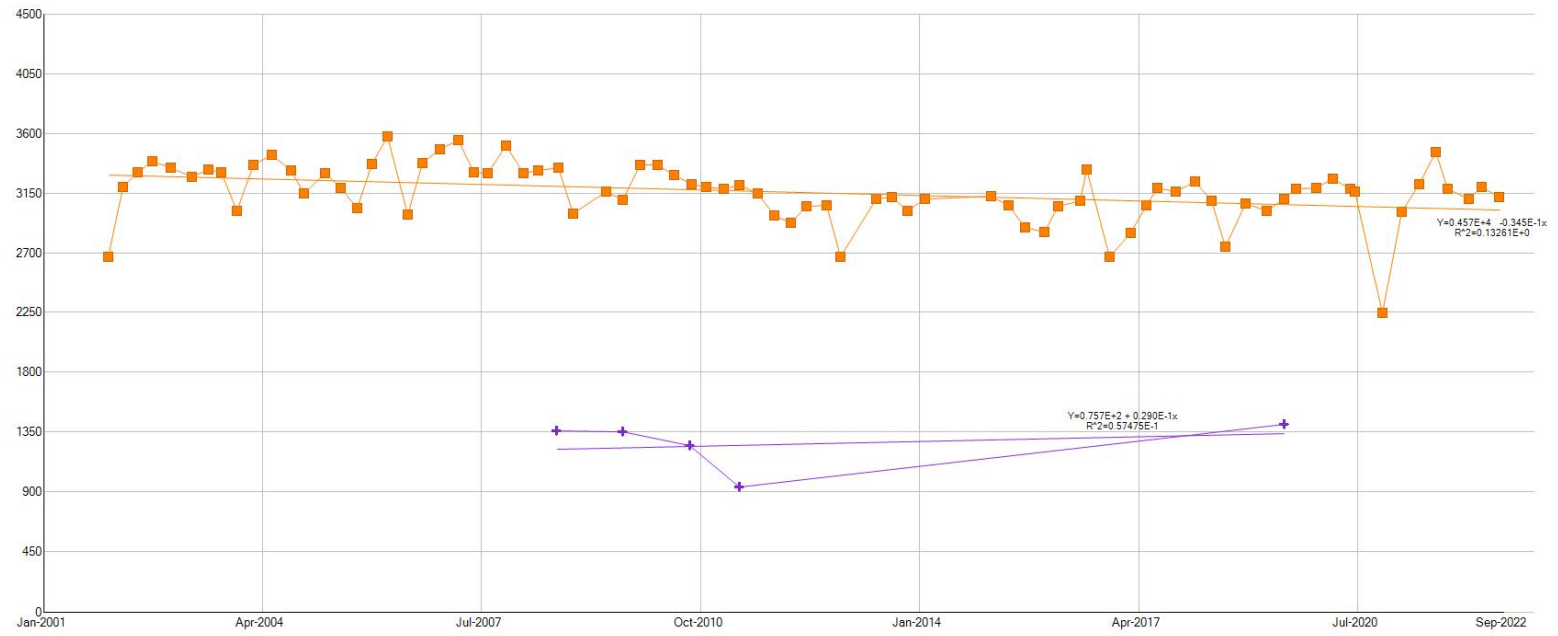
Calcium, dissolved (mg/L)

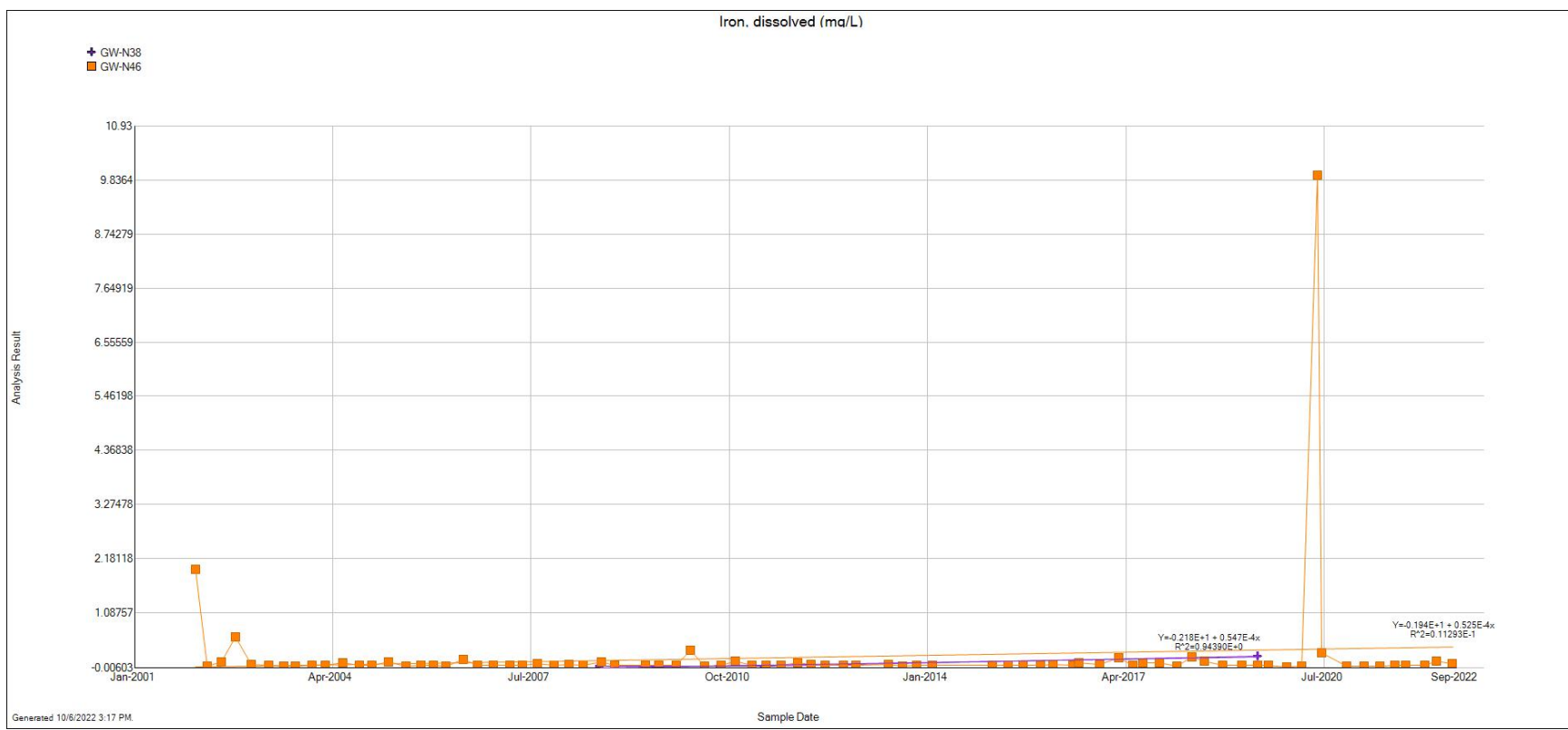
+ GW-N38
 ■ GW-N46



Specific Conductance @ 25C (lab) (umhos/cm)

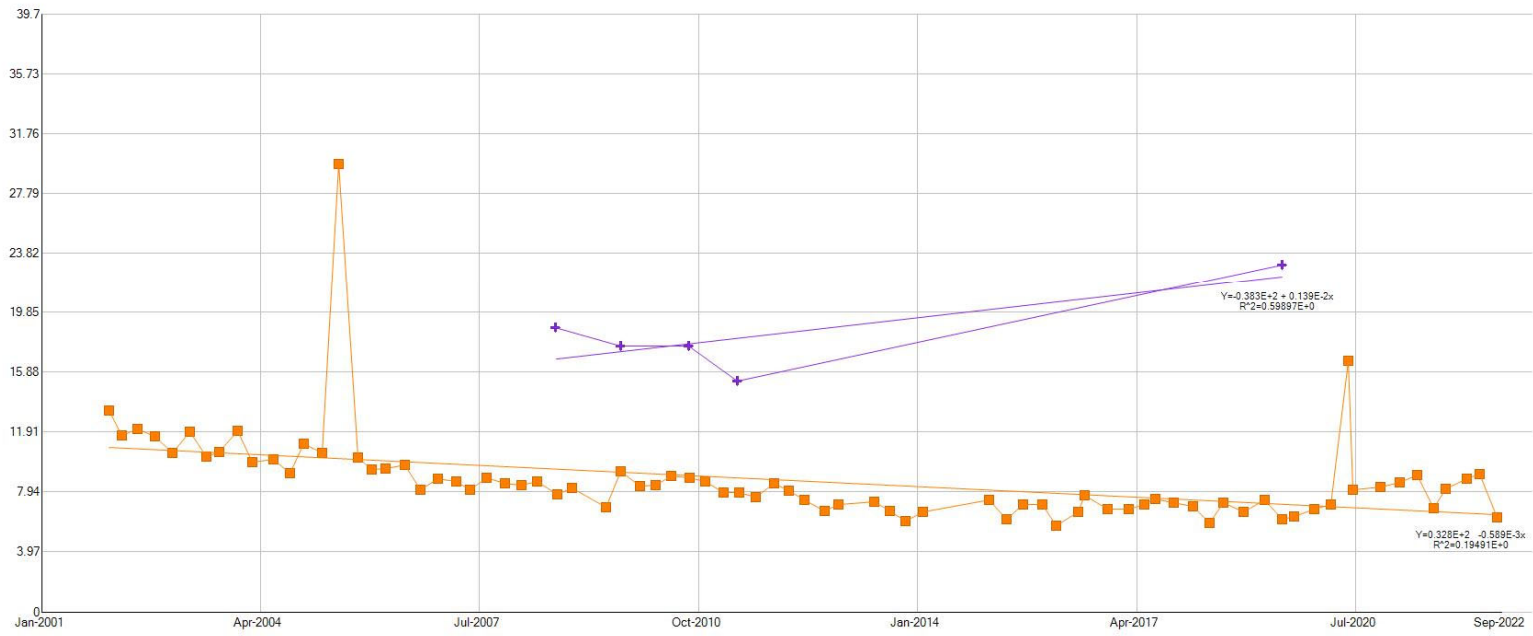
✚ GW-N38
■ GW-N46





Magnesium, dissolved (mg/L)

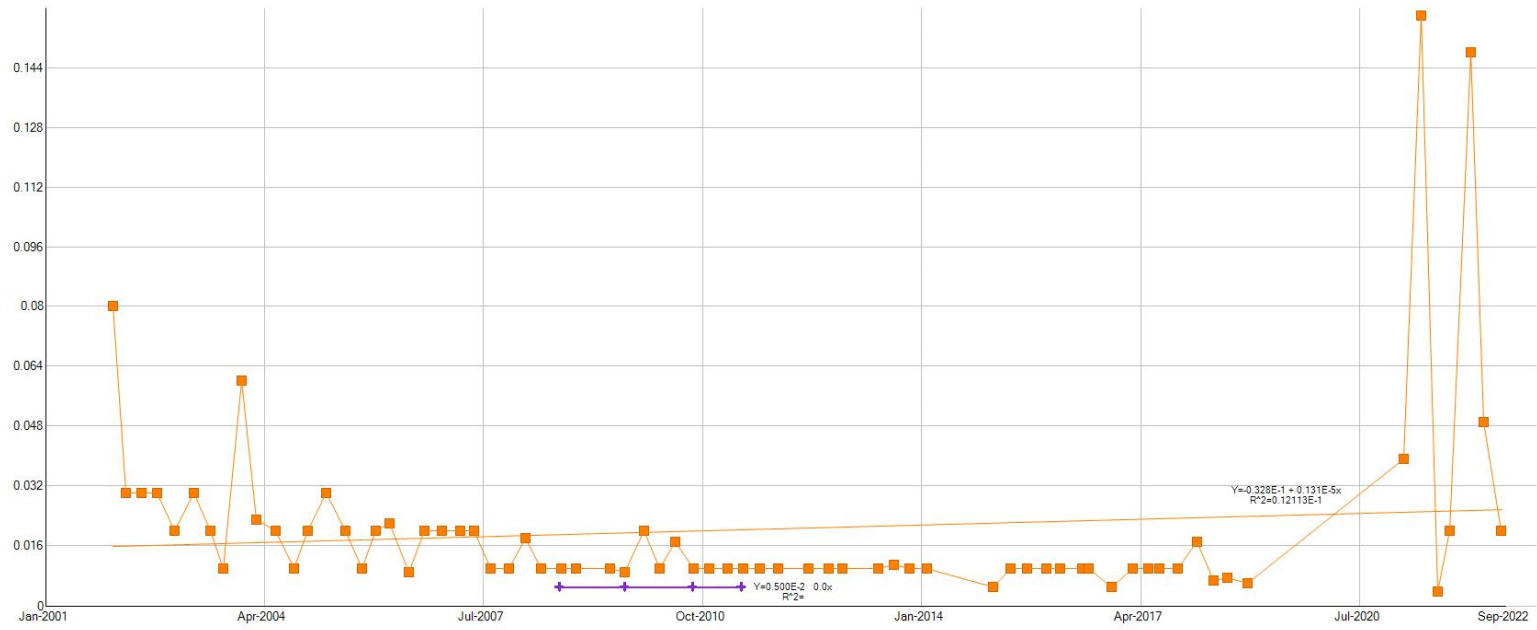
✚ GW-N38
■ GW-N46



Manganese, dissolved (mg/L)

✚ GW-N38
■ GW-N46

Analysis Result



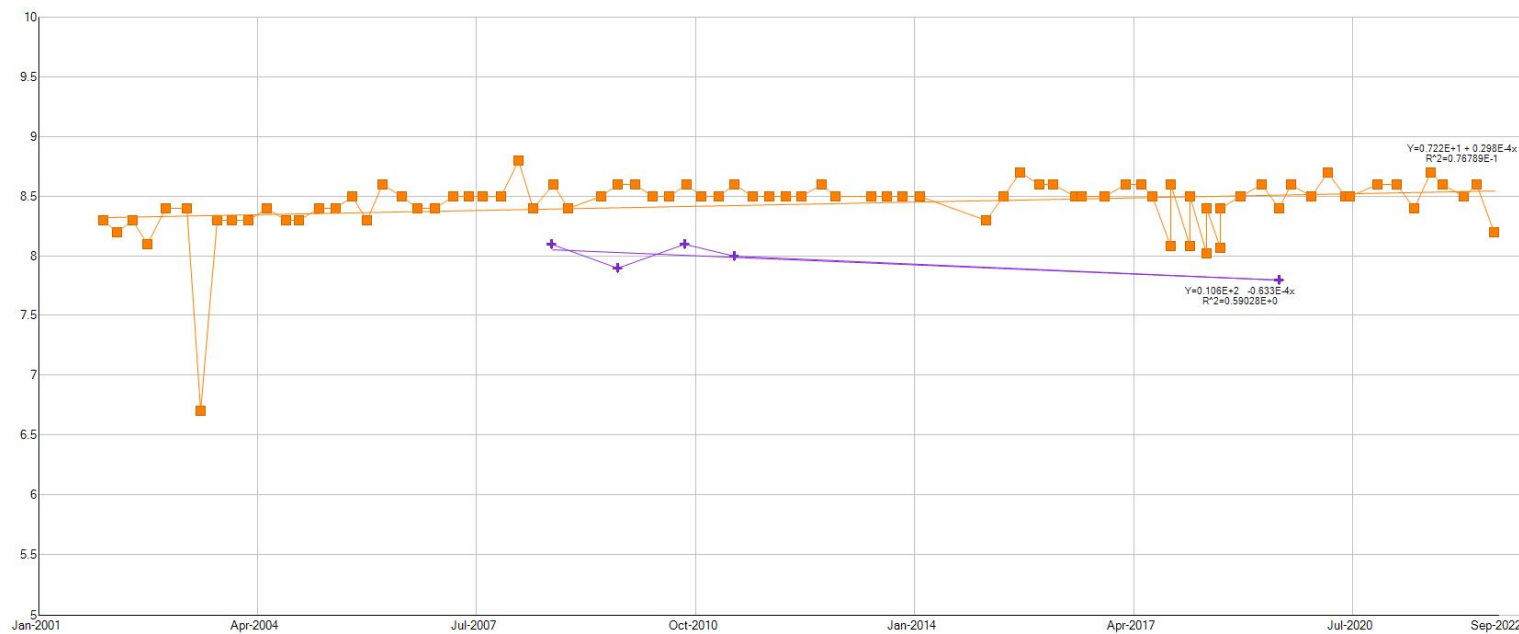
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Sample Date

pH (lab)

✦ GW-N38
■ GW-N46

Analysis Result

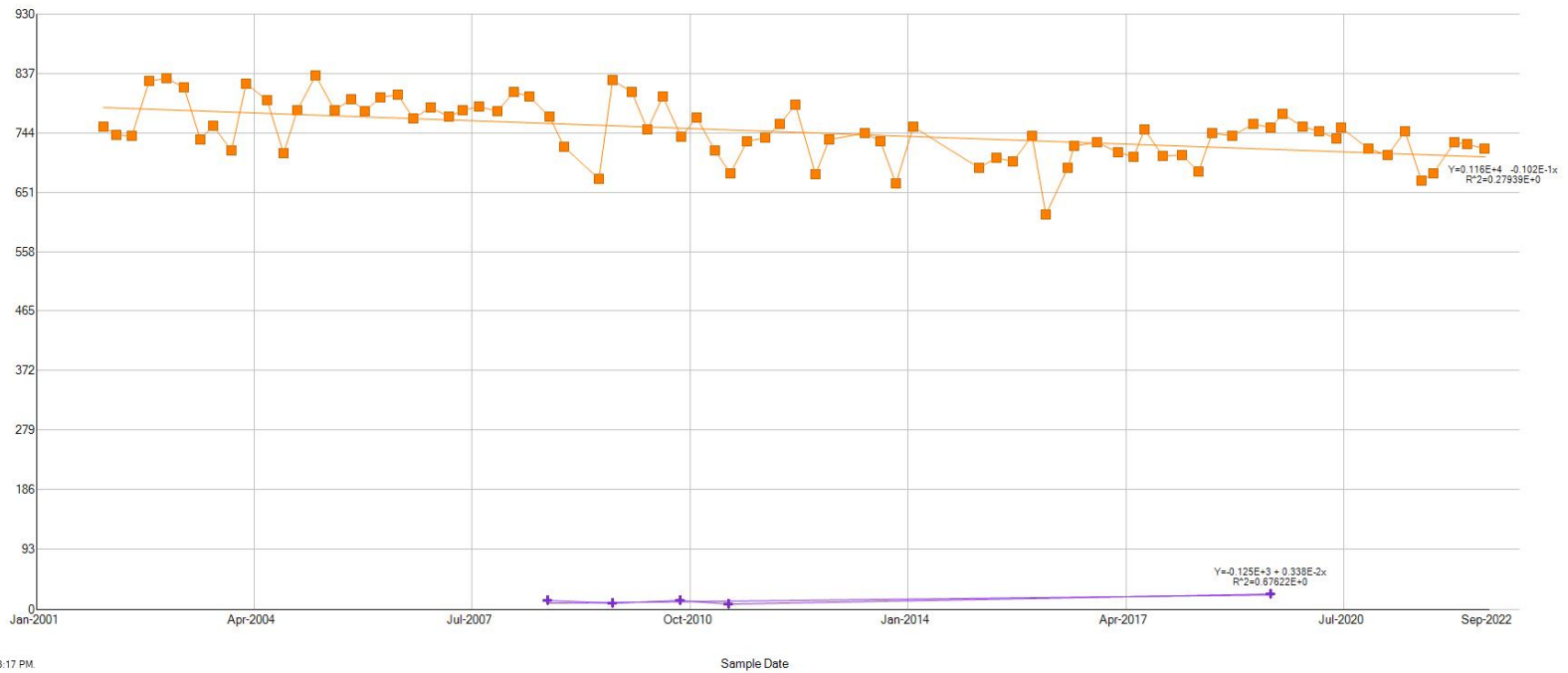


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Sample Date

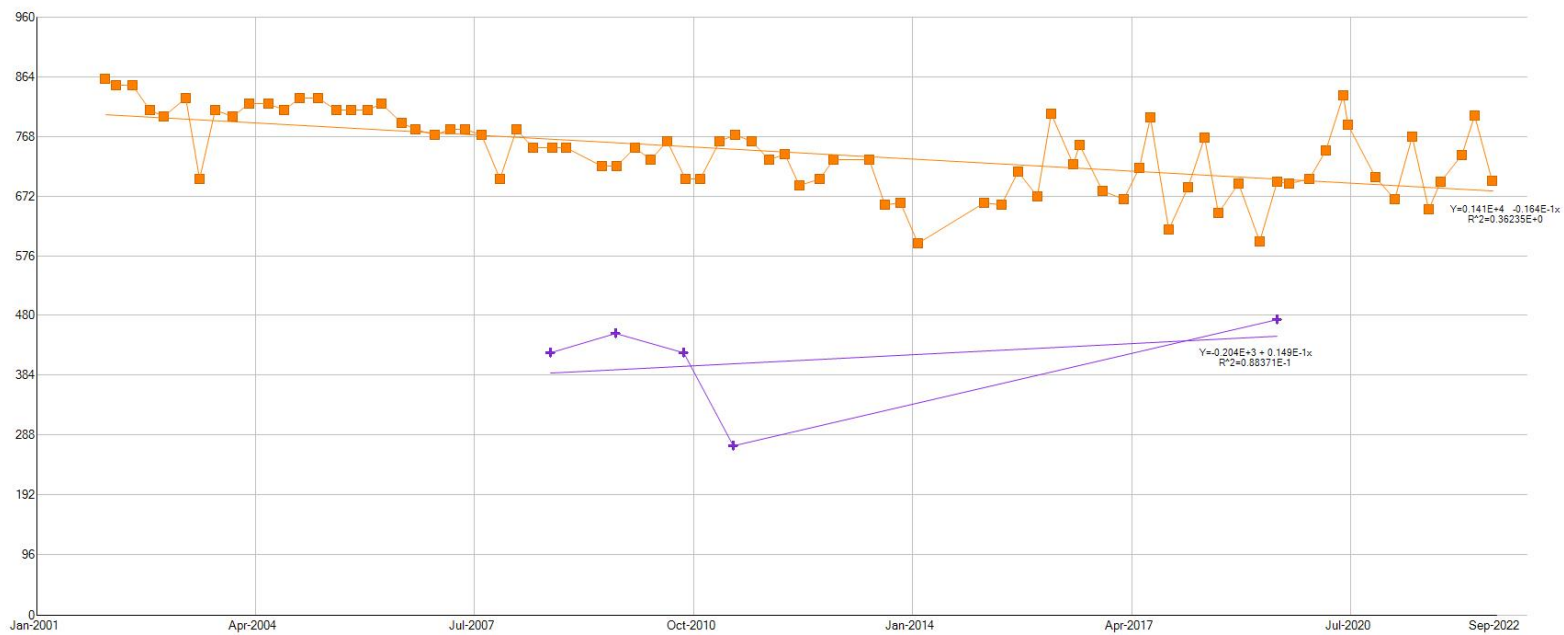
Sodium, dissolved (mg/L)

✚ GW-N38
■ GW-N46



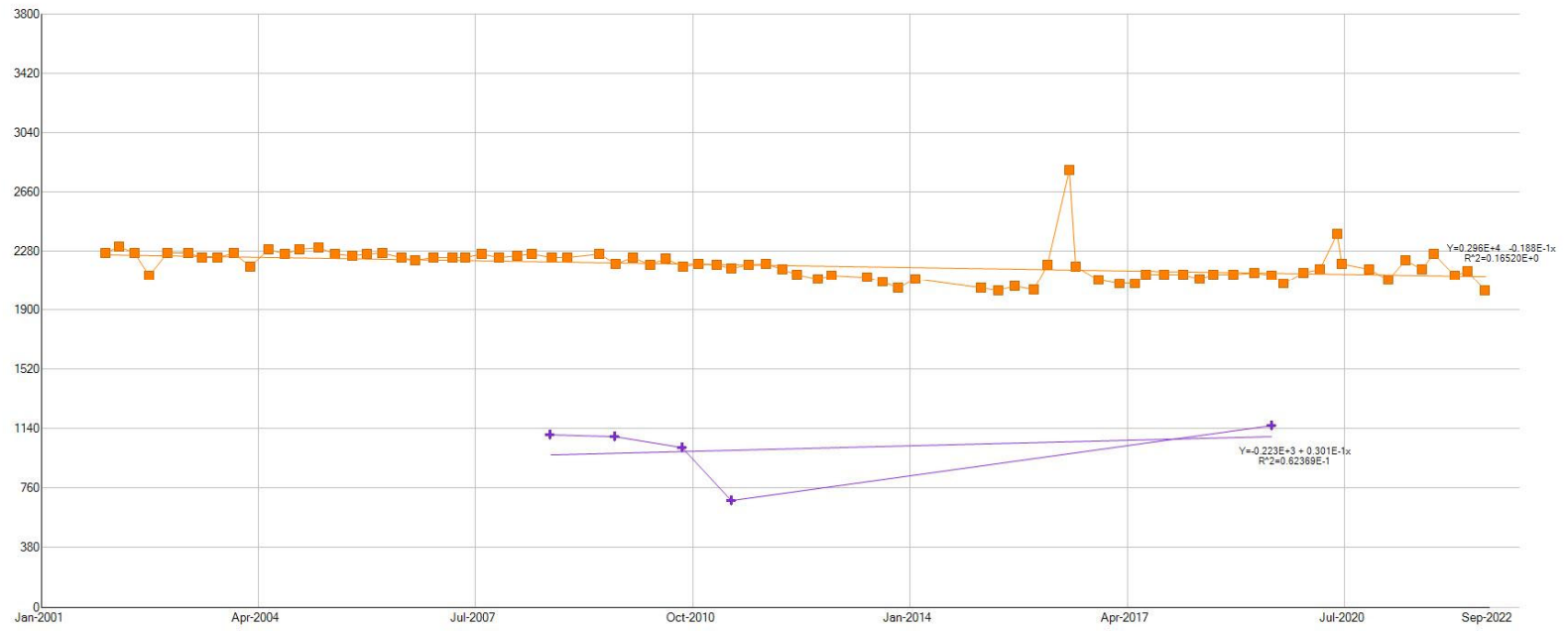
Sulfate, dissolved (mg/L)

+ GW-N38
 ■ GW-N46



Total Dissolved Solids (mg/L)

✦ GW-N38
■ GW-N46



Appendix 5
Groundwater Elevations

