TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.
HEADQUARTERS: P.O. BOX 33695 DENVER, COLORADO 80233-0695 303-452-6111

December 23, 2019

Mrs. Janet Binns
Division of Reclamation, Mining and Safety
1313 Sherman Street, RM 215
Denver, Colorado 80203

RE: Annual Hydrology Report
New Horizon North Mine
Mine Permit No. C-2010-089

Dear Mrs. Binns:

Enclosed please find the Annual Hydrology Report for the 2019 Water Year (October 2018 – September 2019) for Elk Ridge Mining and Reclamation, LLC (Elk Ridge) New Horizon North 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 North Mine.

If you have any questions about the enclosed report, please contact Tony Tennyson at (970) 824-1232.

Sincerely,

Daniel J. Casiraro
Senior Manager
Environmental Services

DJC:TT:der

Enclosure

cc: Frank Ferris (via email)
G474.11.3(21)c-6

2019 Annual Hydrology Report

Water Year October 1, 2018 to September 30, 2019

Elk Ridge Mining and Reclamation, LLC

New Horizon North Mine

Permit No. C-2010-089

Table of Contents

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

(i) Water quantity monitoring data for the water year is presented Appendices 1 and 3 of this report.

(ii) Water quality monitoring data for the water year is presented in Appendices 1 and 3 of this report. Discharge monitoring reports (DMR) are submitted to the Colorado Department of Public Health and Environment. Copies of each DMR are provided quarterly 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 2018 through September 2019.

A description of the surface and ground water monitoring plan including the monitoring frequency is located in Appendix 2.05.6(3)-3. All monitoring locations are shown on Maps 2.04-7-1 and 2.04.7-10. This previously mentioned information can be located in Permit No. C-2010-089.

Surface Water

Surface water monitoring sites are comprise of several sites which comprise the current, upstream and downstream condition and are briefly described below. Please see Map 2.04.7-1 for monitoring locations.

- SW-N1 is located on Tuttle Draw and represents the down gradient condition below mining.
- SW-N3 is located on Tuttle Draw and represents the down gradient condition below mining.
- SW-N202 is located on Meehan Draw and represents the downstream condition below mining.
- SW-N207 is located on Meehan Draw and represents and up gradient condition.
- SW-N208 is located on Meehan Draw and represents and up gradient condition.
- SW-N209 is located at the inlet of the North Lateral and represents up gradient condition.
- SW-N210 is located at an inlet of an irrigation pipe and represents the up gradient condition.
- SW-N213 is located on Nygren Draw and represents the up gradient condition.

- SW-N214 is located on Nygren Draw and represents the down gradient condition.

- SW-N215 is located on an unnamed draw upstream of the Meehan Draw Confluence and represents the up gradient condition.

- SW-N216 is located on unnamed draw downstream of the Meehan Draw Confluence and represents the down gradient condition.

- SW-N217 is located on the San Miguel River upstream of the Tuttle Draw Confluence and represents up gradient condition.

- SW-N218 is located on the San Miguel River downstream at Coal Canyon Confluence and represents a down gradient condition.

- SS-1 is located at the toe of the backfill of the old Nucla Mine (NH1), and represents a pre-mine and down gradient condition for NHN.

- SS-2 is located 50 yards upstream of SS-1, at the toe of the backfill of the old Nucla Mine, and represents a pre-mine and down gradient condition for NHN.

New Horizon North currently samples each surface water site for a variety of quality parameters. Of all the parameters that are analyzed for, 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. Surface water monitoring data for the water year can be found in Appendix 1, and surface water summary graphs of the indicator parameters for all monitoring locations are provided in Appendix 2.

Tuttle Draw – Data for sites SW-N1 (up gradient site) and SW-N3 (down gradient site) have been complied and are shown on the summary tables below and graphically. Summary tables for indicator parameters are provide below for each site and include data from 2008 to the end of September of 2019 if available.

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)	970	620	2,613	2,475	297	9/26/12	6/5/19
TDS (mg/l)	712	544	2,475	2,690	215	9/26/12	5/16/17
Sulfate (mg/l)	335	323	1,679	1,700	52	9/26/12	6/5/19
Calcium (mg/l)	123	86	455	496	41	9/26/12	6/5/19
Iron (tot rec ug/l)	1,174	1,426	7,320	7,500	180	8/12/10	11/15/16
Magnesium (mg/l)	57	50	195	204	9	9/26/12	6/5/19
Sodium (mg/l)	22	16	45	49	5	2/23/11	6/5/19

SW-N3							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.2	0.1	0.6	8.6	8.0	9/4/08	11/14/17
Lab Cond. (umhos/cm)	1,978	980	2,818	3,640	822	2/10/15	5/23/16
TDS (mg/l)	1,736	1,050	2,901	3,440	539	2/10/15	5/23/16
Sulfate (mg/l)	1,014	670	1,947	2,220	273	2/10/15	9/17/19
Calcium	265	137	378	483	105	11/174/14	5/23/16
Iron (toc rec ug/l)	1,040	1,024	4,540	4,670	130	8/10/10	5/14/08
Magnesium (mg/l)	124	80	225	259	34	11/17/14	5/23/16
Sodium (mg/l)	73	54	197	212	15	2/18/12	5/23/16

A review of the water year data indicates a minimum levels for laboratory pH, electrical conductivity, calcium, sulfate, magnesium, and sodium occurred at SW-N1. One minimum for sulfate occurred at SW-N3. No other minimum or maximums occur for the indicator parameters at these sampling locations. As shown on the graphs for indicator parameters, both the up gradient and down gradient locations tend to track the same. Sampling results indicate normal seasonal fluctuations also including influences by annual irrigation.

Meehan Draw – Data for sites SW-N202 (down gradient site), SW-N207 (up gradient site), SW-N208 (up gradient site), SW-N215 (up gradient), and SW-N216 (down gradient) have been complied and are shown on the summary tables below and graphically. Summary tables for indicator parameters are provide below for each site and include data from 2008 to the end of September of 2019 if available.

SW-N202							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	7.9	0.4	1.3	8.4	7.1	6/5/19	2/12/15
Lab Cond. (umhos/cm)	1,254	409	1,312	2,040	728	2/21/18	5/22/14
TDS (mg/l)	979	428	1,443	1,880	437	2/21/18	5/22/14
Sulfate (mg/l)	580	354	1,092	1,260	168	3/20/12	5/16/17
Calcium (mg/l)	200	77	245	351	106	3/20/12	5/16/17
Iron (tot rec ug/l)	1,710	1,756	9,520	9,770	250	2/21/18	5/23/16
Magnesium (mg/l)	55	24	83	108	26	3/3/10	5/22/14
Sodium (mg/l)	18	6	19	29	11	2/21/18	5/22/14

SW-N207							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.4	0.1	0.6	8.6	8.0	6/16/09	2/11/14
Lab Cond. (umhos/cm)	812	160	548	1,070	522	11/18/15	8/11/12
TDS (mg/l)	531	137	444	760	316	11/13/18	8/23/12
Sulfate (mg/l)	184	70	236	340	104	11/27/12	8/19/15
Calcium (mg/l)	110	23	97	149	53	11/27/12	2/11/14
Iron (tot rec ug/l)	403	343	1,350	1,410	60	6/7/10	12/1/10
Magnesium (mg/l)	38	13	51	65	14	10/23/08	8/14/12
Sodium (mg/l)	14	5	17	23	7	11/27/12	8/14/12

SW-N208							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.3	0.1	0.3	8.5	8.2	6/16/09	5/12/11
Lab Cond. (umhos/cm)	577	148	422	767	345	6/17/09	5/11/12
TDS (mg/l)	363	110	319	527	208	6/24/09	5/21/12
Sulfate (mg/l)	128	47	150	210	60	6/11/09	5/16/17
Calcium (mg/l)	90	26	67	119	52	5/22/14	5/16/12
Iron (tot rec ug/l)	434	345	1,210	1,300	90	5/17/12	9/17/19
Magnesium (mg/l)	17	8	26	34	8	6/11/09	5/16/12
Sodium (mg/l)	8	4	13	18	5	6/11/09	5/16/12

SW-N215							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.3	0.1	0.2	8.4	8.2	8/24/16	2/12/14
Lab Cond. (umhos/cm)	1,429	779	1,789	2,370	581	5/27/14	5/23/16
TDS (mg/l)	1,136	706	1,503	1,860	357	5/27/14	5/23/16
Sulfate (mg/l)	653	467	987	1,130	143	5/27/14	5/23/16
Calcium (mg/l)	187	100	249	320	71	2/12/14	5/23/16
Iron (tot rec ug/l)	873	1,484	3,740	3,870	130	11/25/13	5/26/16
Magnesium (mg/l)	98	69	146	169	23	5/27/14	5/26/16
Sodium (mg/l)	26	17	40	50	9	5/27/14	5/23/16

SW-N216							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.1	0.2	0.5	8.3	7.8	8/11/12	11/17/14
Lab Cond. (umhos/cm)	1,735	703	2,026	2,810	784	2/12/15	5/29/13
TDS (mg/l)	1,461	788	2,144	2,660	516	3/27/12	5/29/13
Sulfate (mg/l)	916	589	1,640	1,880	240	2/11/16	5/29/13
Calcium (mg/l)	269	124	348	453	105	3/20/12	5/29/13
Iron (tot rec ug/l)	1,443	671	3,010	3,580	570	2/6/17	5/28/15
Magnesium (mg/l)	104	60	176	211	35	3/20/12	5/29/13
Sodium (mg/l)	24	9	26	37	11	3/20/12	5/29/13

A review of the water year data indicates some maximum levels for lab pH at SW-N202 and TDS at SW-N207. One minimum occurred for iron at SW-N208. No other maximums or minimums occurred at any of the sampling locations on Meehan Draw occurred during the water year. As shown on the graphs for SW-N202, SW-N207, and SW-N208 all indicator parameters indicates that up gradient and drown gradient sampling results are tending to track in in a similar manner. Sampling results indicate normal seasonal fluctuations also including influences by annual irrigation.

Irrigation Water – Data for sites SW-N209 (up gradient) and SW-N210 (up gradient) have been complied and are shown on the summary tables below and graphically. Summary tables for indicator parameters are provide below for each site and include data from 2008 to the end of September of 2019 if available.

SW-N209							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.3	0.1	0.5	8.6	8.1	8/19/14	5/22/14
Lab Cond. (umhos/cm)	332	66	203	433	230	11/24/10	5/30/13
TDS (mg/l)	193	50	173	278	105	9/17/19	5/16/17
Sulfate (mg/l)	74	32	117	118	2	8/28/18	5/16/17
Calcium (mg/l)	52	12	41	75	34	8/24/09	6/5/19
Iron (tot rec ug/l)	1,573	1,270	3,995	4,150	155	5/30/13	9/17/19
Magnesium (mg/l)	6.2	1.2	4.8	8.7	3.9	11/30/10	5/30/13
Sodium (mg/l)	4.4	1.0	3.8	6.6	2.8	11/30/10	5/30/13

SW-N210							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.2	0.1	0.1	8.2	8.1	8/24/16	8/19/13
Lab Cond. (umhos/cm)	383	25	36	401	365	8/24/16	8/19/13
TDS (mg/l)	236	12	17	244	227	8/24/16	8/19/13
Sulfate (mg/l)	104	3	4	106	102	8/19/13	8/24/16
Calcium (mg/l)	62	4	6	65	59	8/24/16	8/19/13
Iron (tot rec ug/l)	165	92	130	230	100	8/24/16	8/19/13
Magnesium (mg/l)	6.7	0.9	1.3	7.3	6.0	8/24/16	8/19/13
Sodium (mg/l)	4.7	0.4	0.6	5.0	4.4	8/24/16	8/19/13

Both of these sites present the quality of the irrigation water and do not represent waters potentially influenced by mining activities as all irrigation water is contained within a pipeline.

Nygren Draw – Data for sites SW-N213 (up gradient) and SW-N214 (down gradient) have been complied and are shown on the summary tables below and graphically. Summary tables for indicator parameters are provide below for each site and include data from 2008 to the end of September of 2019 if available.

SW-N213							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.4	0.1	0.2	8.5	8.3	5/27/15	5/22/14
Lab Cond. (umhos/cm)	922	213	839	1,390	551	11/18/15	5/22/14
TDS (mg/l)	620	191	746	1,060	314	11/18/15	5/22/14
Sulfate (mg/l)	243	96	367	471	104	11/18/15	5/22/14
Calcium (mg/l)	119	26	91	169	78	9/7/11	5/22/14
Iron (tot rec ug/l)	157	110	390	400	10	8/21/12	11/26/13
Magnesium (mg/l)	43.4	15.5	67	87.4	20.4	11/18/15	5/22/14
Sodium (mg/l)	21.5	7.8	32.2	42.7	10.5	11/18/15	5/22/14

SW-N214							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.4	0.1	0.2	8.5	8.3	5/13/11	5/22/14
Lab Cond. (umhos/cm)	915	216	826	1,380	554	11/18/15	5/22/14
TDS (mg/l)	615	183	688	1,010	322	11/18/15	5/22/14
Sulfate (mg/l)	240	91	333	436	103	11/18/15	5/22/14
Calcium (mg/l)	119	26	91	170	79	9/7/11	5/22/14
Iron (tot rec ug/l)	229	164	660	670	10	5/31/13	11/26/13
Magnesium (mg/l)	41.8	15.6	66.4	87.3	20.9	11/18/15	5/22/14
Sodium (mg/l)	21.3	7.8	31.8	42.5	10.7	11/18/15	5/22/14

A review of the water year data indicates no minimums or maximums were recorded at either sampling location. As shown on the graphs for indicator parameters, no significant trending has occurred for either location, and both locations track almost exactly the same. Sampling results indicate normal seasonal fluctuations also including influences by annual irrigation.

San Miguel River – Data for sites SW-N217 (up gradient) and SW-N218 (down gradient) have been complied and are shown on the summary tables below and graphically. Please note that at SW-N217 and SW-N218 the only sampling locations that are sampled for include lab pH, lab electrical conductivity, total dissolved solids, dissolved iron, total iron, total manganese, and acidity. These two sites differ from all the other sampling locations.

Summary tables for all parameters are provide below for each site and include data from 2008 to the end of September of 2019 if available. Please see Appendix 2.05.6(3)-3 for additional information.

SW-N217							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.4	0.2	0.8	8.7	7.9	5/12/12	11/27/12
Lab Cond. (umhos/cm)	681	228	867	1,140	273	9/18/19	5/29/13
TDS (mg/l)	481	179	706	876	170	9/18/19	5/29/13
Iron, diss (mg/l)	0.04	0.05	0.21	0.22	0.006	5/27/15	2/25/19
Iron, total (mg/l)	3.64	10.65	54.06	54.10	0.05	8/27/13	9/18/19
Acidity CaCO3 (mg/l)	5.8	2.1	7	12.0	5.0	6/6/18	3/20/12
Manganese (mg/l)	0.131	0.211	1.150	1.160	0.010	8/27/13	9/18/19
TSS (mg/l)	192.7	680.7	3647.5	3650.0	2.5	8/27/13	2/12/15

SW-N218							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.4	0.1	0.8	8.7	7.9	8/21/12	11/27/12
Lab Cond. (umhos/cm)	791	276	1,164	1,490	326	8/29/18	5/29/13
TDS (mg/l)	573	228	970	1,180	210	8/29/18	5/29/13
Iron, diss (mg/l)	0.05	0.08	0.37	0.38	0.01	8/19/14	2/27/13
Iron, total (mg/l)	2.32	5.87	31.55	31.60	0.05	8/27/13	2/21/18
Acidity CaCO3 (mg/l)	5.8	2.1	7.0	12.0	5.0	6/6/19	3/20/12
Manganese (mg/l)	0.125	0.146	0.787	0.817	0.030	8/27/13	9/18/19
TSS (mg/l)	102.9	288.7	1,567.5	1,570.0	2.5	8/27/13	8/21/12

A review of the water year data indicated two maximums for laboratory conductivity and TDS occurred at SW-N217, and three minimums for iron (dissolved and total) and manganese also occurred at SW-N217. At SW-N218 one minimum level for manganese occurred and one maximum for acidity. As shown on the graphs for indicator parameters both monitoring locations track identical to each other.

Spoil Springs – Data for sites SS-1 (toe of backfill NH1 mine) and SS-2 (up gradient of SS-1) have been complied and are shown on the summary tables below and graphically. Summary tables for indicator parameters are provide below for each site and include data from 2008 to the end of September of 2019 if available.

SS-1							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.0	0.1	0.5	8.2	7.7	11/25/13	5/22/14
Lab Cond. (umhos/cm)	2,929	536	2,916	3,430	514	2/12/15	11/25/13
TDS (mg/l)	2,751	588	2.970	3,280	310	11/17/14	11/25/13
Sulfate (mg/l)	1,656	439	2,009	2,150	141	11/17/14	11/25/13
Calcium (mg/l)	482	97	511	586	75	11/17/14	11/25/13
Iron (tot rec ug/l)	1,516	2,307	10,091	10,400	309	11/27/12	5/8/18
Magnesium (mg/l)	204	46	245	259	14	2/12/15	11/25/13
Sodium (mg/l)	40.6	9.7	46.3	53.7	7.4	5/8/18	11/25/13

SS-2							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	-	-	-	-	-	-	-
Lab Cond. (umhos/cm)	-	-	-	-	-	-	-
TDS (mg/l)	-	-	-	-	-	-	-
Sulfate (mg/l)	-	-	-	-	-	-	-
Calcium (mg/l)	-	-	-	-	-	-	-
Iron (tot rec ug/l)	-	-	-	-	-	-	-
Magnesium (mg/l)	-	-	-	-	-	-	-
Sodium (mg/l)	-	-	-	-	-	-	-

A review of the water year indicates a no minimum or maximum values occurred at SS-1. SS-2 was did not flow for the entire water year.

Ground Water

Ground water monitoring sites are comprised of several sites which comprise the current, upstream and downstream condition and are briefly described below. Please see Map 2.04.7-1 for monitoring locations.

- GW-N50 monitors the underburden aquifer and represents the up gradient condition.
- GW-N51 monitors the Dakota coal aquifer and represents the up gradient condition.
- GW-N52 monitors the overburden aquifer and represents the up gradient condition.
- GW-N53 monitors the underburden aquifer and represents the down gradient condition.
- GW-N54 monitors the Dakota coal aquifer which represents the down gradient condition.
- GW-N55 monitors the overburden aquifer which represents the down gradient condition.
- GW-N56 monitors the underburden aquifer down-dip of the mining area.
- GW-N57 monitors the Dakota coal aquifer down-dip of the mining area.
- GW-N58 monitors the overburden aquifer down-dip of the mining area.

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 the hydrology report. These are lab pH, lab conductivity, TDS, sulfate, calcium, iron, magnesium, sodium and elevation. Ground water monitoring data for the water year can be found in Appendix 1, and ground water summary graphs of the indicator parameters for all monitoring locations are provided in Appendix 2.

GW-N50, GW-N51, and GW-N52 Well Series:

GW-N50 monitors the overburden aquifer and represents the up gradient condition above mining activities. GW-N51 monitors the Dakota coal aquifer, and GW-N52 monitors the underburden aquifer. Both wells also represent the up gradient condition above mining.

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

GW-N50							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	7.7	0.2	0.8	8.1	7.3	6/3/10	8/25/09
Lab Cond. (umhos/cm)	2,523	367	1,430	3,140	1,710	2/25/09	9/23/19
TDS (mg/l)	2,176	341	1,350	2,740	1,390	2/25/15	9/23/19
Sulfate (mg/l)	1,354	1,253	8,476	9,180	704	9/23/19	5/15/19
Calcium (mg/l)	327	49	198	413	215	3/1/11	11/30/09
Iron (toc rec ug/l)	7,335	3,865	15,670	17,500	1,830	5/21/14	2/18/14
Manganese (mg/l)	0.96	0.27	1.08	1.55	0.47	5/21/14	2/14/18
Sodium (mg/l)	116.9	28.9	95.3	152.0	56.7	11/13/18	9/23/19
Magnesium (mg/l)	174	38	142	234	92	3/1/11	10/17/08

GW-N51							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	6.8	0.6	2.3	7.9	5.6	2/20/13	11/15/17
Lab Cond. (umhos/cm)	1,037	118	564	1,410	846	5/22/09	2/14/18
TDS (mg/l)	752	110	535	1,100	565	5/28/09	5/21/14
Sulfate (mg/l)	456	115	469	700	231	5/26/09	5/21/14
Calcium (mg/l)	115	21	83	167	84	8/25/11	2/9/17
Iron (toc rec ug/l)	19,463	13,472	56,340	57,200	860	5/17/18	5/21/14
Manganese (mg/l)	1.01	0.41	1.36	1.96	0.60	8/29/11	11/15/17
Sodium (mg/l)	26.9	7.2	35.7	50.3	14.6	5/20/09	2/10/16
Magnesium (mg/l)	50.8	9.8	50.1	85.7	35.6	5/20/09	2/10/16

GW-N52							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	7.7	0.2	1.3	8.3	7.0	8/26/11	11/15/17
Lab Cond. (umhos/cm)	877	141	597	1,250	653	11/23/11	8/23/17
TDS (mg/l)	617	121	600	1,030	430	12/2/11	5/21/12
Sulfate (mg/l)	287	87	412	580	168	12/1/11	5/15/12
Calcium (mg/l)	166	35	162	279	117	11/22/11	8/23/17
Iron (toc rec ug/l)	60	133	723	730	7	3/23/10	7/24/18
Manganese (mg/l)	0.02	0.02	0.10	0.10	0.01	10/17/08	5/28/11
Sodium (mg/l)	7.3	1.0	4.8	10.5	5.7	3/25/19	8/23/17
Magnesium (mg/l)	18.3	3.9	20.0	32.0	12.0	11/22/11	8/23/17

A review of the water year for this series of wells indicates maximum values for sulfate and sodium and minimum values for laboratory specific conductivity, TDS, sulfate, and sodium occurred at GW-N50. One maximum value for sodium occurred at GW-N51. These wells are up gradient of mining and represent groundwater conditions that are not influenced by mining activities.

GW-N53, GW-N54, and GW-N55 Well Series

GW-N53 monitors the underburden aquifer which represents the down gradient condition from mining. GW-N54 monitors the Dakota coal aquifer which represents the down gradient condition from mining, and GW-N55 monitors the overburden aquifer also down gradient of mining.

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

GW-N53							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	8.0	0.1	0.5	8.2	7.7	10/18/08	11/13/13
Lab Cond. (umhos/cm)	3,276	144	680	3,530	2,850	11/14/18	7/25/18
TDS (mg/l)	2,814	181	680	3,250	2,570	5/15/19	5/28/09
Sulfate (mg/l)	1,574	101	430	1,830	1,400	2/25/15	5/26/09
Calcium (mg/l)	303	16	70	335	265	9/16/19	12/1/10
Iron (toc rec ug/l)	385	506	2,160	2,180	20	7/25/18	3/23/10
Manganese (mg/l)	0.055	0.047	0.135	0.140	0.005	11/19/16	12/1/09
Sodium (mg/l)	201	22	73	238	165	8/25/11	11/28/17
Magnesium (mg/l)	246	14	73	281	208	11/23/11	12/1/10

GW-N54							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	7.9	0.1	0.5	8.1	7.6	10/18/08	8/20/14
Lab Cond. (umhos/cm)	4,698	991	3,960	6,100	2,140	8/20/14	11/24/10
TDS (mg/l)	4,702	1,1174	5,280	6,940	1,660	2/25/15	12/8/10
Sulfate (mg/l)	3,038	880	4,120	5,030	910	2/25/15	12/7/10
Calcium (mg/l)	436	85	333	534	201	11/17/15	9/1/10
Iron (toc rec ug/l)	4,461	44673	20,300	21,000	700	8/20/14	5/17/12
Manganese (mg/l)	0.502	0.215	0.740	0.870	0.130	11/13/13	6/2/10
Sodium (mg/l)	168	36	146	213	67	8/24/09	8/31/10
Magnesium (mg/l)	581	154	654	880	226	11/17/15	12/1/10

GW-N55							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	7.8	0.1	0.4	8.1	7.7	2/27/10	11/30/17
Lab Cond. (umhos/cm)	8,277	2,058	6,500	11,600	5,100	9/23/19	8/26/15
TDS (mg/l)	10.007	3,358	8,900	14,600	5,700	9/23/19	8/26/15
Sulfate (mg/l)	6,709	2,373	7,000	10,700	3,700	9/23/19	11/30/09
Calcium (mg/l)	458	22	74	496	422	3/3/10	2/8/17
Iron (toc rec ug/l)	956	1,016	3,750	3,800	50	8/26/15	3/2/10
Manganese (mg/l)	0.27	0.22	0.66	0.67	0.02	5/31/17	8/25/11
Sodium (mg/l)	351	38	130	444	314	8/25/11	2/8/17
Magnesium (mg/l)	1,496	634	1,640	2,290	650	6/19/19	2/18/14

A review of the water year data indicates one maximum value for TDS occurred at GW-N53. GW-N55 exhibited several maximum values for laboratory electrical conductivity, TDS, sulfate, and magnesium. GW-N55 is slightly trending upward for several of the indicator parameters. GW-N53 and GW-N54 tend to track similar with sampling results indicating normal seasonal fluctuations including influences for seasonal irrigation.

GW-N56, GW-N57, and GW-N58 Well Series

GW-N56 monitors the overburden aquifer up gradient of the mining area. GW-N57 monitors the Dakota coal aquifer up gradient of the mining area, and GW-N58 monitors the underburden aquifer up gradient of the mining area.

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

GW-N56							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	7.8	0.11	0.4	8.0	7.6	8/14/13	11/27/12
LabCond. (umhos/cm)	3,968	264	990	4,440	3,450	8/14/13	8/26/15
TDS (mg/l)	3,709	343	1,330	4,450	3,120	3/25/19	8/29/12
Sulfate (mg/l)	2,236	218	700	2,600	1,900	5/28/13	5/26/15
Calcium (mg/l)	491	80	288	606	318	5/17/16	8/29/12
Iron (toc rec ug/l)	8,320	12,871	49,750	49,900	150	5/9/18	5/21/14
Manganese (mg/l)	0.29	0.26	1.19	1.20	0.01	5/9/18	5/21/14
Sodium (mg/l)	177	50	254	395	141	11/27/12	5/17/16
Magnesium (mg/l)	122	154	387	416	19	3/25/19	8/29/12

GW-N57							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	7.7	0.1	0.4	7.9	7.5	2/19/13	5/17/16
Lab Cond. (umhos/cm)	4,617	244	1,090	4,980	3,890	8/9/17	8/26/15
TDS (mg/l)	4,679	332	1,440	5,280	3,840	9/21/16	5/26/15
Sulfate (mg/l)	3,044	253	1,160	3,650	2,490	9/21/16	5/26/15
Calcium (mg/l)	513	18	70	548	478	7/24/18	5/17/16
Iron (toc rec ug/l)	4,379	6,116	31,310	32,400	1,090	2/26/15	11/14/14
Manganese (mg/l)	0.67	0.21	0.73	0.99	0.26	8/9/17	8/20/14
Sodium (mg/l)	144	21	73	174	101	2/17/14	5/26/15
Magnesium (mg/l)	511	41	184	574	390	11/9/16	5/26/15

GW-N58							
Parameter	**Mean**	**Std dev**	**Range**	**Max.**	**Min.**	**Max at**	**Min at**
Lab pH	7.5	0.3	1.1	7.9	6.8	5/28/18	5/28/13
Lab Cond. (umhos/cm)	8,948	3,144	11,410	16,000	4,590	5/28/13	2/14/18
TDS (mg/l)	10,673	4,391	15,510	20,000	4,850	5/28/13	2/14/18
Sulfate (mg/l)	7,544	3,592	11,940	15,000	3,060	5/28/13	2/14/18
Calcium (mg/l)	469	26	102	532	430	11/27/12	5/21/14
Iron (toc rec ug/l)	36,861	43,524	116,950	117,000	50	11/27/12	11/17/15
Manganese (mg/l)	2.26	2.20	5.99	6.15	0.16	11/27/12	5/9/18
Sodium (mg/l)	311	282	1,308	1,460	152	5/28/13	8/29/12
Magnesium (mg/l)	1,713	839	2,636	3,150	514	11/13/13	2/14/18

A review of the water year data indicates two maximums occurred for TDS and magnesium at GW-N56. None of the other wells in this series exhibited any maximums or minimums. As shown on the graphs for indicator parameters, GW-N56 is tending down for a majority of the indicator parameters while GW-N57 and GW-N58 are trending steadily the same as one another with sampling results indicating normal seasonal fluctuations including influences for seasonal irrigation.

Appendix 1
Surface Water Monitoring Data

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Site: SW-N202

	10/30/2018	11/13/2018	12/19/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/5/2019	7/17/2019	9/16/2019
Ag, diss, mg/L		<0.0						<0.0		<0.0
Al, tot rec, ug/L		250.						240.		290.
Alkalinity, lab, mg/L		124.						233.		253.
As, diss, mg/L		0.000500						0.000700		0.000900
B, diss, mg/L		0.210						0.0900		0.0800
Ca, diss, mg/L		240.						107.		137.
Cation-Anion Bal, %		5.600						-3.400		0.000
Cd, diss, mg/L		0.000200						<0.0		<0.0
Cl, diss, mg/L		10.7						5.80		6.60
CO3, mg/L		<0.0						<0.0		<0.0
Cr, hex, diss, mg/L		<0.0								
Cr, tri, diss, ug/L		<0.0								
Cu, diss, mg/L		<0.0						0.00330		<0.0
Fe, diss, mg/L		0.694						0.0760		0.0380
Fe, tot rec, ug/L		1090.						505.		608.
FlowStreamInst, cfs	0.180	0.184	0.053	0.055	0.026	0.255	0.189	2.300		1.800
Hardness, mg/L		867.						394.		497.
HCO3, mg/L		124.						225.		253.
Hg, diss, mg/L		<0.0						<0.0		<0.0
K, diss, mg/L		3.80						1.90		2.60
Mg, diss, mg/L		65.1						30.9		37.6
Mn, diss, mg/L		0.300						0.0300		0.140
Mn, tot rec, ug/L		664.						140.		170.
Mo, diss, mg/L		<0.0						<0.0		<0.0
Na, diss, mg/L		27.0						12.6		14.7
NH3 as N, diss, mg/L		0.100						<0.0		<0.0
Ni, diss, mg/L		0.0160						<0.0		<0.0
NO2 + NO3, diss, mg/L		0.0800						<0.0		0.0200
NO2, diss, mg/L		<0.0						<0.0		<0.0
NO3, diss, mg/L		0.0800						<0.0		0.0200
OH, mg/L		<0.0						<0.0		<0.0
Pb, diss, mg/L		0.000300						0.000100		<0.0
pH (field), pH	7.320	7.430	6.820	7.050	7.010	6.860	7.250	7.900	8.070	7.900
pH (lab), pH		7.600						8.400		8.200
PO4, tot, mg/L								0.0600		<0.0
PO4, total soluble, mg/L		<0.0								
SAR, ratio		0.400						0.280		0.290
Se, diss, mg/L		0.000700						0.000300		0.000400
SO4, diss, mg/L		652.						213.		253.
Spec. Cond. (field), umhos/cm	1492	1645	1944	1805	2200	1437	1434	841	809	910
Spec. Cond. (lab), umhos/cm		1550.000						803.000		921.000
SS, mL/L/hr		<0.000						<0.000		<0.000
Sulfide, tot, mg/L		<0.0						<0.0		<0.0
Sum Anions, meq/L		17.000						9.100		11.000
Sum Cations, meq/L		19.000						8.500		11.000
TDS (calculated), mg/L		1080.						509.		606.
TDS (ratio-measured/calc), rat		1.240						1.160		1.130
TDS, mg/L		1340.						588.		686.
Temp (Celcius), degrees C	8.700	3.400	5.600	3.500	2.300	9.500	11.100	13.000	18.200	15.500
U, diss, mg/L		0.00100						0.00260		0.00140
Zn, diss, mg/L		0.0400						<0.0		<0.0

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Site: SW-N207

	10/30/2018	11/13/2018	12/18/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/5/2019	7/17/2019	9/17/2019
Ag, diss, mg/L		<0.0								<0.0
Al, tot rec, ug/L		840.								110.
Alkalinity, lab, mg/L		347.								285.
As, diss, mg/L		0.000900								0.00170
B, diss, mg/L		0.100								0.0700
Ca, diss, mg/L		132.								121.
Cation-Anion Bal, %		-4.000								4.700
Cd, diss, mg/L		<0.0								<0.0
Cl, diss, mg/L		11.5								6.30
CO3, mg/L		19.9								7.90
Cr, hex, diss, mg/L		<0.0								
Cr, tri, diss, ug/L		<0.0								
Cu, diss, mg/L		<0.0								<0.0
Fe, diss, mg/L		0.0320								0.0380
Fe, tot rec, ug/L		424.								211.
FlowStreamInst, cfs	0.052	0.000	0.000	0.000	0.000	0.041	0.200	1.600		
Hardness, mg/L		557.								471.
HCO3, mg/L		327.								277.
Hg, diss, mg/L		<0.0								<0.0
K, diss, mg/L		3.30								2.80
Mg, diss, mg/L		55.1								40.9
Mn, diss, mg/L		0.0230								0.120
Mn, tot rec, ug/L		141.								150.
Mo, diss, mg/L		<0.0								<0.0
Na, diss, mg/L		19.1								14.1
NH3 as N, diss, mg/L		<0.0								<0.0
Ni, diss, mg/L		<0.0								<0.0
NO2 + NO3, diss, mg/L		<0.0								<0.0
NO2, diss, mg/L		<0.0								<0.0
NO3, diss, mg/L		<0.0								<0.0
OH, mg/L		<0.0								<0.0
Pb, diss, mg/L		0.000100								<0.0
pH (field), pH	8.450	8.510	8.340			7.880	8.350	8.020	8.000	7.700
pH (lab), pH		8.400								8.300
PO4, tot, mg/L										0.220
PO4, total soluble, mg/L		<0.0								
SAR, ratio		0.360								0.290
Se, diss, mg/L		0.000900								0.000300
SO4, diss, mg/L		254.								152.
Spec. Cond. (field), umhos/cm	1026	1110	1132			1159	1124	625	648	9
Spec. Cond. (lab), umhos/cm		1040.000								837.000
SS, mL/L/hr		<0.000								<0.000
Sulfide, tot, mg/L		<0.0								<0.0
Sum Anions, meq/L		13.000								9.100
Sum Cations, meq/L		12.000								10.000
TDS (calculated), mg/L		686.								511.
TDS (ratio-measured/calc), rat		1.110								1.150
TDS, mg/L		760.								588.
Temp (Celcius), degrees C	9.300	5.500	4.100			9.500	3.000	12.600	17.900	15.300
U, diss, mg/L		0.00660								0.00190
Zn, diss, mg/L		<0.0								<0.0

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Site: SW-N208

	10/30/2018	11/13/2018	12/18/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/5/2019	7/17/2019	9/17/2019
Ag, diss, mg/L										<0.0
Al, tot rec, ug/L										70.0
Alkalinity, lab, mg/L										174.
As, diss, mg/L										0.000300
B, diss, mg/L										0.0200
Ca, diss, mg/L										93.3
Cation-Anion Bal, %										1.600
Cd, diss, mg/L										<0.0
Cl, diss, mg/L										3.60
CO3, mg/L										<0.0
Cu, diss, mg/L										<0.0
Fe, diss, mg/L										0.00900
Fe, tot rec, ug/L										90.0
FlowStreamInst, cfs								0.200		0.100
Hardness, mg/L										308.
HCO3, mg/L										173.
Hg, diss, mg/L										<0.0
K, diss, mg/L										1.30
Mg, diss, mg/L										18.3
Mn, diss, mg/L										<0.0
Mn, tot rec, ug/L										<0.0
Mo, diss, mg/L										<0.0
Na, diss, mg/L										6.80
NH3 as N, diss, mg/L										<0.0
Ni, diss, mg/L										<0.0
NO2 + NO3, diss, mg/L										<0.0
NO2, diss, mg/L										<0.0
NO3, diss, mg/L										<0.0
OH, mg/L										<0.0
Pb, diss, mg/L										<0.0
pH (field), pH								7.910	7.890	7.740
pH (lab), pH										8.300
PO4, tot, mg/L										0.0300
SAR, ratio										0.170
Se, diss, mg/L										0.000200
SO4, diss, mg/L										131.
Spec. Cond. (field), umhos/cm								603	885	605
Spec. Cond. (lab), umhos/cm										597.000
SS, mL/L/hr										<0.000
Sulfide, tot, mg/L										<0.0
Sum Anions, meq/L										6.300
Sum Cations, meq/L										6.500
TDS (calculated), mg/L										360.
TDS (ratio-measured/calc), rat										1.160
TDS, mg/L										418.
Temp (Celcius), degrees C								12.600	17.200	17.000
U, diss, mg/L										0.00210
Zn, diss, mg/L										<0.0

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Site: SW-N209

	10/30/2018	11/13/2018	12/18/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/5/2019	7/17/2019	9/17/2019
Ag, diss, mg/L								<0.0		<0.0
Al, tot rec, ug/L								3430.		220.
Alkalinity, lab, mg/L								79.6		85.1
As, diss, mg/L								0.000600		0.000800
B, diss, mg/L								<0.0		<0.0
Ca, diss, mg/L								33.7		72.6
Cation-Anion Bal, %								-4.200		4.500
Cd, diss, mg/L								0.0000600		0.0000500
Cl, diss, mg/L								2.10		3.40
CO3, mg/L								<0.0		<0.0
Cu, diss, mg/L								0.00780		0.000900
Fe, diss, mg/L								0.0250		0.0110
Fe, tot rec, ug/L								1830.		155.
FlowStreamInst, cfs								1.000		1.140
Hardness, mg/L								105.		213.
HCO3, mg/L								78.4		85.1
Hg, diss, mg/L								<0.0		<0.0
K, diss, mg/L								1.00		1.30
Mg, diss, mg/L								5.00		7.70
Mn, diss, mg/L								<0.0		<0.0
Mn, tot rec, ug/L								140.		10.0
Mo, diss, mg/L								<0.0		<0.0
Na, diss, mg/L								3.50		5.90
NH3 as N, diss, mg/L								<0.0		<0.0
Ni, diss, mg/L								<0.0		<0.0
NO2 + NO3, diss, mg/L								0.100		0.0500
NO2, diss, mg/L								<0.0		<0.0
NO3, diss, mg/L								0.100		0.0500
OH, mg/L								<0.0		<0.0
Pb, diss, mg/L								0.000400		0.000300
pH (field), pH								8.300	8.550	8.200
pH (lab), pH								8.300		8.300
PO4, tot, mg/L								0.0600		0.0300
SAR, ratio								0.150		0.180
Se, diss, mg/L								0.000500		0.000400
SO4, diss, mg/L								38.7		112.
Spec. Cond. (field), umhos/cm								255	237	424
Spec. Cond. (lab), umhos/cm								238.000		424.000
SS, mL/L/hr								0.200		<0.000
Sulfide, tot, mg/L								<0.0		<0.0
Sum Anions, meq/L								2.500		4.200
Sum Cations, meq/L								2.300		4.600
TDS (calculated), mg/L								132.		255.
TDS (ratio-measured/calc), rat								1.180		1.090
TDS, mg/L								156.		278.
Temp (Celcius), degrees C								10.600	15.700	16.200
U, diss, mg/L								0.000200		0.000500
Zn, diss, mg/L								0.0100		<0.0

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Site: SW-N210

	10/30/2018	11/13/2018	12/19/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/5/2019	7/17/2019	9/17/2019
FlowStreamInst, cfs										
pH (field), pH									7.950	
Spec. Cond. (field), umhos/cm									298	
Temp (Celcius), degrees C									20.400	

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Site: SW-N213

	10/30/2018	11/13/2018	12/19/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/5/2019	7/17/2019	9/17/2019
Ag, diss, mg/L										<0.0
Al, tot rec, ug/L								50.0		<0.0
Alkalinity, lab, mg/L										301.
As, diss, mg/L								0.000800		0.00110
B, diss, mg/L								0.100		0.120
Ca, diss, mg/L								116.		143.
Cation-Anion Bal, %								-4.800		4.000
Cd, diss, mg/L								<0.0		<0.0
Cl, diss, mg/L								12.0		12.7
CO3, mg/L								22.5		13.8
Cu, diss, mg/L								0.00210		<0.0
Fe, diss, mg/L										0.0250
Fe, tot rec, ug/L										61.0
FlowStreamInst, cfs								1.300		1.200
Hardness, mg/L										579.
HCO3, mg/L								242.		287.
Hg, diss, mg/L										<0.0
K, diss, mg/L										4.40
Mg, diss, mg/L										53.9
Mn, diss, mg/L										0.0100
Mn, tot rec, ug/L										20.0
Mo, diss, mg/L										<0.0
Na, diss, mg/L										25.9
NH3 as N, diss, mg/L										<0.0
Ni, diss, mg/L										<0.0
NO2 + NO3, diss, mg/L										0.0400
NO2, diss, mg/L										<0.0
NO3, diss, mg/L										0.0400
OH, mg/L										<0.0
Pb, diss, mg/L										<0.0
pH (field), pH								8.250	8.160	8.100
pH (lab), pH										8.400
PO4, tot, mg/L										0.220
SAR, ratio										0.470
Se, diss, mg/L										0.000400
SO4, diss, mg/L										263.
Spec. Cond. (field), umhos/cm								1	702	1049
Spec. Cond. (lab), umhos/cm								953.000		1060.000
SS, mL/L/hr										<0.000
Sulfide, tot, mg/L										<0.0
Sum Anions, meq/L										12.000
Sum Cations, meq/L										13.000
TDS (calculated), mg/L										686.
TDS (ratio-measured/calc), rat										1.150
TDS, mg/L										790.
Temp (Celcius), degrees C								11.500	17.900	14.800
U, diss, mg/L										0.00230
Zn, diss, mg/L										<0.0

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Site: SW-N215

	10/31/2018	11/13/2018	12/19/2018	1/15/2019	2/25/2019	3/28/2019	4/16/2019	6/4/2019	7/17/2019	9/3/2019
Ag, diss, mg/L	Dry All Year									
Al, tot rec, ug/L										
Alkalinity, lab, mg/L										
As, diss, mg/L										
B, diss, mg/L										
Ca, diss, mg/L										
Cation-Anion Bal, %										
Cd, diss, mg/L										
Cl, diss, mg/L										
CO3, mg/L										
Cr, hex, diss, mg/L										
Cr, tri, diss, ug/L										
Cu, diss, mg/L										
Fe, diss, mg/L										
Fe, tot rec, ug/L										
FlowStreamInst, cfs										
Hardness, mg/L										
HCO3, mg/L										
Hg, diss, mg/L										
K, diss, mg/L										
Mg, diss, mg/L										
Mn, diss, mg/L										
Mn, tot rec, ug/L										
Mo, diss, mg/L										
Na, diss, mg/L										
NH3 as N, diss, mg/L										
Ni, diss, mg/L										
NO2 + NO3, diss, mg/L										
NO2, diss, mg/L										
NO3, diss, mg/L										
OH, mg/L										
Pb, diss, mg/L										
pH (field), pH										
pH (lab), pH										
PO4, tot, mg/L										
PO4, total soluble, mg/L										
SAR, ratio										
Se, diss, mg/L										
SO4, diss, mg/L										
Spec. Cond. (field), umhos/cm										
Spec. Cond. (lab), umhos/cm										
SS, mL/L/hr										
Sulfide, tot, mg/L										
Sum Anions, meq/L										
Sum Cations, meq/L										
TDS (calculated), mg/L										
TDS (ratio-measured/calc), rat										
TDS, mg/L										
Temp (Celcius), degrees C										
U, diss, mg/L										
Zn, diss, mg/L										

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Site: SW-N214

	10/30/2018	11/13/2018	12/19/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/5/2019	7/17/2019	9/17/2019
Ag, diss, mg/L										<0.0
Al, tot rec, ug/L										<0.0
Alkalinity, lab, mg/L										304.
As, diss, mg/L										0.00110
B, diss, mg/L										0.110
Ca, diss, mg/L										140.
Cation-Anion Bal, %										4.000
Cd, diss, mg/L										<0.0
Cl, diss, mg/L										12.7
CO3, mg/L										13.6
Cu, diss, mg/L										<0.0
Fe, diss, mg/L										0.0220
Fe, tot rec, ug/L										76.0
FlowStreamInst, cfs								0.486		1.000
Hardness, mg/L										567.
HCO3, mg/L										290.
Hg, diss, mg/L										<0.0
K, diss, mg/L										4.30
Mg, diss, mg/L										52.8
Mn, diss, mg/L										<0.0
Mn, tot rec, ug/L										<0.0
Mo, diss, mg/L										<0.0
Na, diss, mg/L										25.4
NH3 as N, diss, mg/L										<0.0
Ni, diss, mg/L										<0.0
NO2 + NO3, diss, mg/L										0.0200
NO2, diss, mg/L										<0.0
NO3, diss, mg/L										0.0200
OH, mg/L										<0.0
Pb, diss, mg/L										<0.0
pH (field), pH								8.330	8.290	8.300
pH (lab), pH										8.400
PO4, tot, mg/L										0.220
SAR, ratio										0.470
Se, diss, mg/L										0.000300
SO4, diss, mg/L										261.
Spec. Cond. (field), umhos/cm								966	699	1061
Spec. Cond. (lab), umhos/cm										1050.000
SS, mL/L/hr										<0.000
Sulfide, tot, mg/L										<0.0
Sum Anions, meq/L										12.000
Sum Cations, meq/L										13.000
TDS (calculated), mg/L										681.
TDS (ratio-measured/calc), rat										1.160
TDS, mg/L										790.
Temp (Celcius), degrees C								11.500	17.800	14.300
U, diss, mg/L										0.00230
Zn, diss, mg/L										<0.0

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Site: SW-N216

	10/31/2018	11/13/2018	12/19/2018	1/15/2019	2/25/2019	3/28/2019	4/16/2019	6/4/2019	7/17/2019	9/3/2019
Ag, diss, mg/L		<0.0			<0.0					
Al, tot rec, ug/L		320.			150.			310.		
Alkalinity, lab, mg/L		180.			174.					
As, diss, mg/L		<0.0			<0.0			0.000700		
B, diss, mg/L		0.220			0.220			0.110		
Ca, diss, mg/L		332.			403.			159.		
Cation-Anion Bal, %		3.700			4.600			0.000		
Cd, diss, mg/L		0.000100			0.000200			<0.0		
Cl, diss, mg/L		11.8			10.9			7.30		
CO3, mg/L		<0.0			<0.0			<0.0		
Cr, hex, diss, mg/L		<0.0			<0.0					
Cr, tri, diss, ug/L		<0.0			<0.0					
Cu, diss, mg/L		<0.0			<0.0			0.00770		
Fe, diss, mg/L		0.536			0.440					
Fe, tot rec, ug/L		1770.			1750.					
FlowStreamInst, cfs	0.566	0.308	0.160	0.330	0.019	0.226	0.600	2.160		
Hardness, mg/L		1340.			1640.					
HCO3, mg/L		180.			174.			246.		
Hg, diss, mg/L		<0.0			<0.0					
K, diss, mg/L		4.20			4.00					
Mg, diss, mg/L		124.			153.					
Mn, diss, mg/L		0.240			0.900					
Mn, tot rec, ug/L		750.			950.					
Mo, diss, mg/L		<0.0			<0.0					
Na, diss, mg/L		31.3			30.8					
NH3 as N, diss, mg/L		<0.0			<0.0					
Ni, diss, mg/L		<0.0			<0.0					
NO2 + NO3, diss, mg/L		0.0400			0.0900					
NO2, diss, mg/L		<0.0			<0.0					
NO3, diss, mg/L		0.0400			0.0900					
OH, mg/L		<0.0			<0.0					
Pb, diss, mg/L		<0.0			<0.0					
pH (field), pH	7.560	8.000	7.360	7.450	7.230	7.240	7.340	7.860	8.150	
pH (lab), pH		7.900			7.900					
PO4, tot, mg/L					<0.0					
PO4, total soluble, mg/L		<0.0			<0.0					
SAR, ratio		0.380			0.340					
Se, diss, mg/L		<0.0			0.000300					
SO4, diss, mg/L		1030.			1280.					
Spec. Cond. (field), umhos/cm	2200	2610	3000	2950	3110	2200	2720	2	850	
Spec. Cond. (lab), umhos/cm		2170.000			2660.000			1200.000		
SS, mL/L/hr		<0.000			<0.000					
Sulfide, tot, mg/L		<0.0			<0.0					
Sum Anions, meq/L		26.000			31.000					
Sum Cations, meq/L		28.000			34.000					
TDS (calculated), mg/L		1640.			1990.					
TDS (ratio-measured/calc), rat		1.230			1.290					
TDS, mg/L		2010.			2570.					
Temp (Celcius), degrees C	9.200	2.200	3.900	2.600	1.400	7.700	8.100	14.100	17.500	
U, diss, mg/L		0.00310			0.00260					
Zn, diss, mg/L		0.0200			0.0600					

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Site: SW-N217

	10/30/2018	11/13/2018	12/20/2018	1/15/2019	2/25/2019	3/28/2019	4/16/2019	6/6/2019	7/17/2019	9/18/2019
Fe, diss, mg/L		0.0280			0.00600			0.0210		0.00700
Fe, total, mg/l		0.546			0.113			2.41		0.045
FlowStreamInst, cfs	58.000	50.000	0.000	0.000	0.000	45.000	900.000	1.380		4.380
pH (field), pH	8.220	8.700	8.870	8.590	8.000	8.380	7.930	8.330	8.440	8.300
pH (lab), pH		8.300			8.300			8.300		8.400
Spec. Cond. (field), umhos/cm	617	673	650	862	745	1041	299	341	275	1127
Spec. Cond. (lab), umhos/cm		592.000			669.000			318.000		1140.000
TDS, mg/L		598			446.			232.		876.
Temp (Celcius), degrees C	8.300	2.800	2.000	2.500	1.000	16.400	7.200	11.700	16.100	16.500
Acidity, CaCO3		10			10			12		12
Mn, total, mg/l		0.082			0.07			0.17		0.01

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Site: SW-N218

	10/30/2018	11/13/2018	12/20/2018	1/15/2019	2/25/2019	3/28/2019	4/16/2019	6/6/2019	7/17/2019	9/18/2019
Fe, diss, mg/L		0.0310			0.00800			0.0220		0.0130
Fe, total, mg/l		0.693			0.134			2.39		0.186
FlowStreamInst, cfs	60.000	55.000	0.000	0.000	40.000	125.000	1000.000	1.380		4.380
pH (field), pH	8.400	8.510	8.620		8.200	8.420	8.070	8.400	8.320	8.200
pH (lab), pH		8.400			8.400			8.300		8.500
Spec. Cond. (field), umhos/cm	814	881	846		921	1142	308	367	310	1266
Spec. Cond. (lab), umhos/cm		819.000			848.000			342.000		1200.000
TDS, mg/L		594.			594.			242.		938.
Temp (Celcius), degrees C	8.700	3.700	1.600		0.900	16.400	7.600	12.200	17.000	15.300
Acidity, CaCO3		10			10			12		12
Mn, total, mg/l		0.119			0.081			0.16		0.03

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Well: SW-N3

	10/30/2018	11/13/2018	12/20/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/5/2019	7/17/2019	9/17/2019
Ag, diss, mg/L		<0.0						<0.0		<0.0
Al, tot rec, ug/L		110.			200.			2690.		1190.
Alkalinity, lab, mg/L		432.			408.			155.		199.
As, diss, mg/L		0.000500						0.000700		0.000700
B, diss, mg/L		0.320						0.0700		0.0800
Ca, diss, mg/L		415.			374.			118.		169.
Cation-Anion Bal, %		3.800						-0.500		0.000
Cd, diss, mg/L		<0.0						0.0000600		<0.0
Cl, diss, mg/L		19.9			19.8			5.60		7.80
CO3, mg/L		<0.0			<0.0			<0.0		<0.0
Cr, hex, diss, mg/L		<0.0						0.00900		<0.0
Cr, tri, diss, ug/L		<0.0						<0.0		
Cu, diss, mg/L		<0.0						0.00150		<0.0
Fe, diss, mg/L		0.0700						0.0940		0.0540
Fe, tot rec, ug/L		273.			330.			1370.		710.
FlowStreamInst, cfs	1.267	1.019	1.110	0.647	0.713	1.138	0.300	7.293		2.200
Hardness, mg/L		1820.						456.		645.
HCO3, mg/L		432.			408.			155.		199.
Hg, diss, mg/L		<0.0			<0.0			<0.0		<0.0
K, diss, mg/L		14.2						2.50		4.50
Mg, diss, mg/L		190.			176.			39.3		54.1
Mn, diss, mg/L		0.560						0.0200		0.110
Mn, tot rec, ug/L		910.						190.		200.
Mo, diss, mg/L		<0.0						<0.0		<0.0
Na, diss, mg/L		90.6			77.4			16.0		24.1
NH3 as N, diss, mg/L		1.00			0.640			<0.0		0.0600
Ni, diss, mg/L		<0.0						<0.0		<0.0
NO2 + NO3, diss, mg/L		0.310			0.190			0.0600		0.100
NO2, diss, mg/L		0.0100						<0.0		0.0100
NO3, diss, mg/L		0.300						0.0600		0.0900
OH, mg/L		<0.0			<0.0			<0.0		<0.0
Pb, diss, mg/L		<0.0						0.000300		0.000300
pH (field), pH	8.030	8.100	8.170	8.130	7.830	8.010	8.200	8.100	8.120	7.920
pH (lab), pH		8.200			8.200			8.300		8.300
PO4, tot, mg/L										0.0300
PO4, total soluble, mg/L		<0.0						0.0300		
SAR, ratio		0.940			0.840			0.330		0.420
Se, diss, mg/L		<0.0						0.000500		0.000400
SO4, diss, mg/L		1480.			1050.			325.		475.
Spec. Cond. (field), umhos/cm	3280	3440	3610	3660	3510	2750	3610	947	1199	1159
Spec. Cond. (lab), umhos/cm		3030.000			2880.000			900.000		1180.000
SS, mL/L/hr		<0.000						<0.000		<0.000
Sulfide, tot, mg/L		<0.0						<0.0		<0.0
Sum Anions, meq/L		38.000						10.000		14.000
Sum Cations, meq/L		41.000						9.900		14.000
TDS (calculated), mg/L		2370.						600.		839.
TDS (ratio-measured/calc), rat		1.220						1.140		1.080
TDS, mg/L		2920.			2640.			700.		908.
Temp (Celcius), degrees C	11.700	7.900	6.200	6.200	2.500	13.300	12.800	12.700	17.900	16.400
U, diss, mg/L		0.00460						0.00100		0.00170
Zn, diss, mg/L		<0.0						<0.0		<0.0

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Site: SW-N1

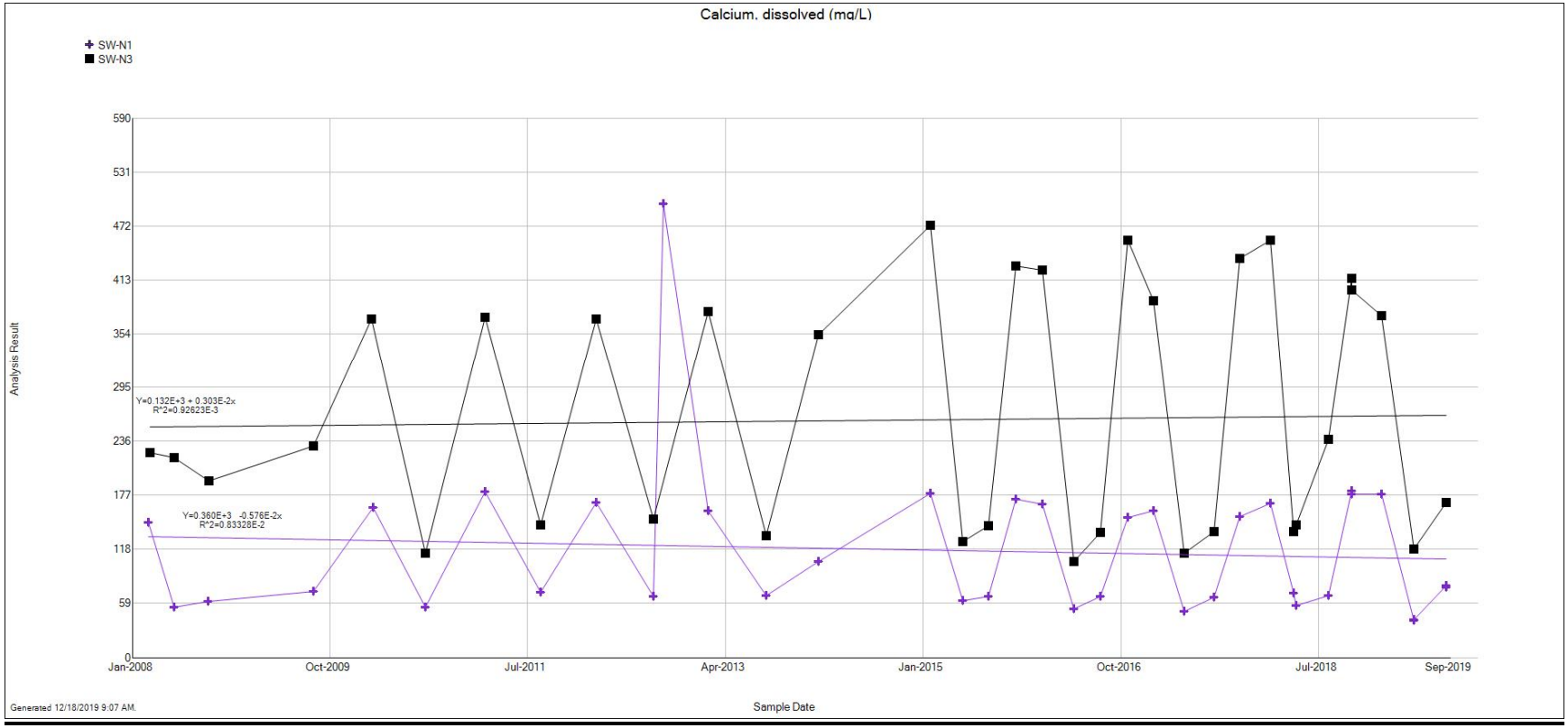
	10/30/2018	11/13/2018	12/20/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/5/2019	7/17/2019	9/17/2019
Ag, diss, mg/L		<0.0						<0.0		<0.0
Al, tot rec, ug/L		80.0			200.			3530.		590.
Alkalinity, lab, mg/L		472.			358.			95.6		106.
As, diss, mg/L		0.000700						0.000800		0.000800
B, diss, mg/L		0.130						0.0300		<0.0
Ca, diss, mg/L		182.			178.			40.9		78.0
Cation-Anion Bal, %		-5.300						0.000		2.000
Cd, diss, mg/L		<0.0						0.0000700		<0.0
Cl, diss, mg/L		15.7			17.2			2.60		4.00
CO3, mg/L		8.20			<0.0			<0.0		<0.0
Cr, hex, diss, mg/L		<0.0								
Cr, tri, diss, ug/L		<0.0								
Cu, diss, mg/L		<0.0						0.00240		0.000900
Fe, diss, mg/L		0.144						0.310		0.0230
Fe, tot rec, ug/L		279.			280.			1720.		360.
FlowStreamInst, cfs	0.120	0.213	1.110	0.200	0.302	0.578	0.900	4.560		0.400
Hardness, mg/L		815.						137.		241.
HCO3, mg/L		472.			358.			95.0		106.
Hg, diss, mg/L		<0.0			<0.0			<0.0		<0.0
K, diss, mg/L		3.40						1.20		1.50
Mg, diss, mg/L		87.5			93.0			8.70		12.0
Mn, diss, mg/L		0.0860						<0.0		<0.0
Mn, tot rec, ug/L		207.						150.		30.0
Mo, diss, mg/L		<0.0						<0.0		<0.0
Na, diss, mg/L		31.3			33.0			4.80		6.90
NH3 as N, diss, mg/L		<0.0			<0.0			<0.0		<0.0
Ni, diss, mg/L		<0.0						<0.0		<0.0
NO2 + NO3, diss, mg/L		<0.0			0.0300			0.0800		0.110
NO2, diss, mg/L		<0.0						<0.0		<0.0
NO3, diss, mg/L		<0.0						0.0800		0.110
OH, mg/L		<0.0			<0.0			<0.0		<0.0
Pb, diss, mg/L		<0.0						0.00130		0.000400
pH (field), pH	8.290	8.140	8.180	8.030	7.840	8.080	8.210	8.330	8.430	8.340
pH (lab), pH		7.100			8.300			8.300		8.300
PO4, tot, mg/L										0.0300
PO4, total soluble, mg/L		<0.0								
SAR, ratio		0.480			0.510			0.180		0.190
Se, diss, mg/L		0.000200						0.000600		0.000400
SO4, diss, mg/L		494.			552.			51.5		130.
Spec. Cond. (field), umhos/cm	1413	1632	1644	1686	1706	1755	1784	324	386	483
Spec. Cond. (lab), umhos/cm		1480.000			1560.000			297.000		490.000
SS, mL/L/hr		<0.000						<0.000		<0.000
Sulfide, tot, mg/L		<0.0								<0.0
Sum Anions, meq/L		20.000						3.000		5.000
Sum Cations, meq/L		18.000						3.000		5.200
TDS (calculated), mg/L		1070.						164.		295.
TDS (ratio-measured/calc), rat		1.060						1.370		1.130
TDS, mg/L		1130.			1180.			224.		334.
Temp (Celcius), degrees C	8.300	1.500	1.600	2.000	1.300	11.600	11.600	11.300	17.200	16.900
U, diss, mg/L		0.00540						0.000400		0.000700
Zn, diss, mg/L		<0.0						<0.0		<0.0

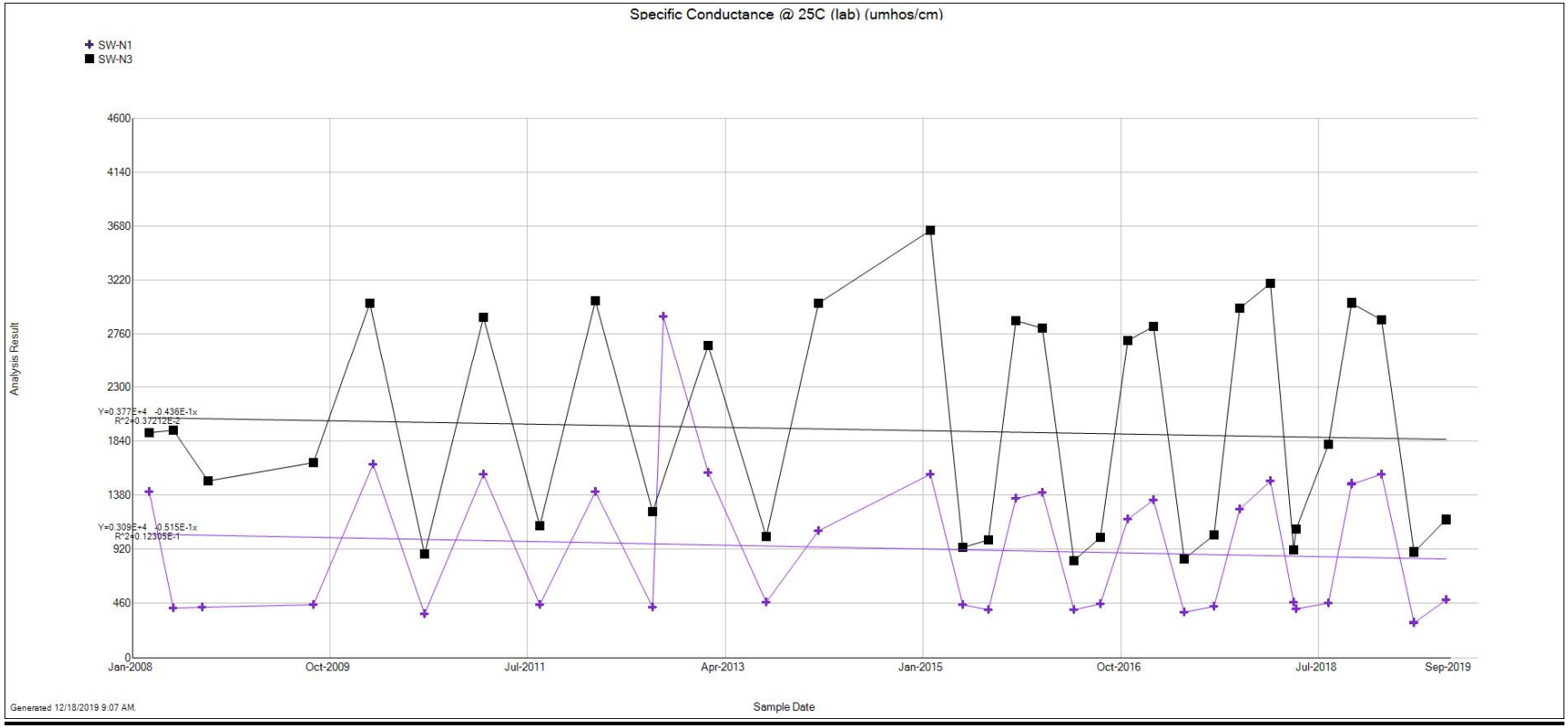
New Horizon North Mine

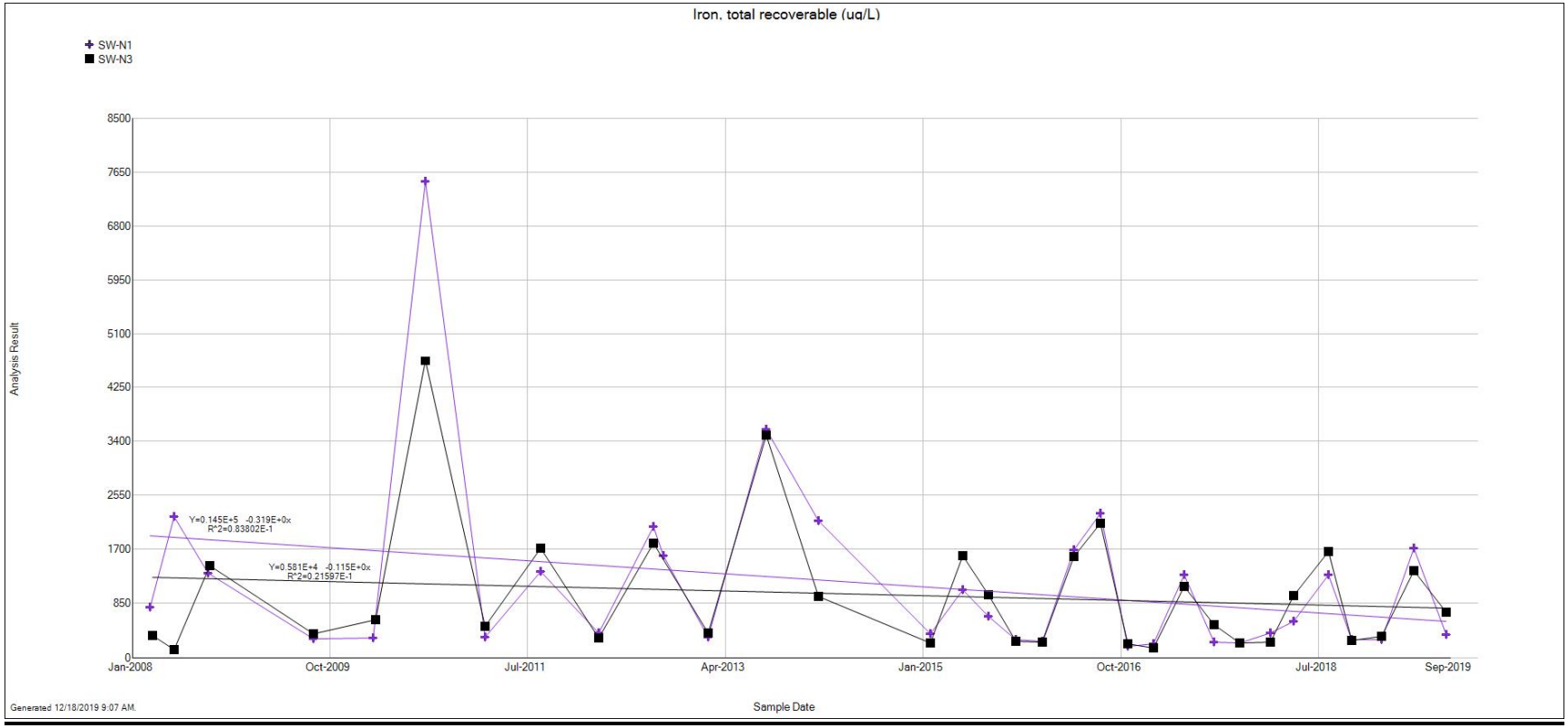
Date Range: 10/01/2018 to 09/30/2019
Site: SS-1

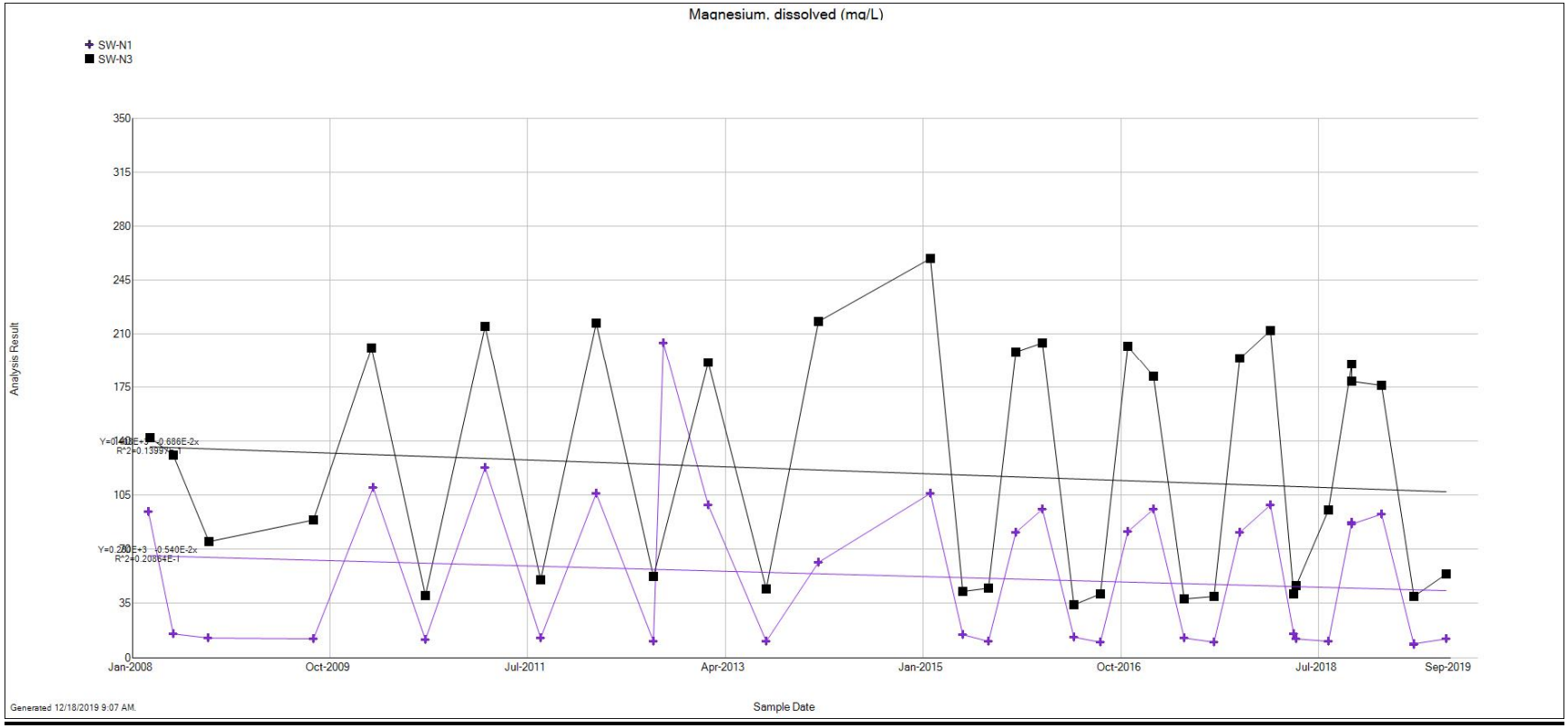
	10/30/2018	11/13/2018	12/19/2018	1/15/2019	2/20/2019	3/28/2019	4/16/2019	6/4/2019	7/17/2019		9/3/2019
Ag, diss, mg/L		<0.0						<0.0			<0.0
Al, tot rec, ug/L		90.0						<0.0			<0.0
Alkalinity, lab, mg/L		429.						431.			436.
As, diss, mg/L		<0.0						<0.0			<0.0
B, diss, mg/L		0.250						0.220			0.230
Ca, diss, mg/L		471.						456.			471.
Cation-Anion Bal, %		2.400						0.000			-1.200
Cd, diss, mg/L		<0.0						<0.0			<0.0
Cl, diss, mg/L		18.0						18.9			19.6
CO3, mg/L		<0.0						<0.0			<0.0
Cr, hex, diss, mg/L		<0.0									
Cr, tri, diss, ug/L		<0.0									
Cu, diss, mg/L		<0.0						0.00500			<0.0
Fe, diss, mg/L		0.0760						0.120			0.380
Fe, tot rec, ug/L		742.						330.			500.
FlowStreamInst, cfs	0.030	0.100	0.096	0.120	0.007	0.100	0.400	0.610			0.100
Hardness, mg/L		2040.						1930.			2000.
HCO3, mg/L		429.						431.			436.
Hg, diss, mg/L		<0.0						<0.0			<0.0
K, diss, mg/L		9.40						8.40			8.60
Mg, diss, mg/L		209.						192.			199.
Mn, diss, mg/L		0.110						0.130			0.420
Mn, tot rec, ug/L		300.						190.			480.
Mo, diss, mg/L		<0.0						<0.0			<0.0
Na, diss, mg/L		46.3						42.9			45.5
NH3 as N, diss, mg/L		<0.0						<0.0			<0.0
Ni, diss, mg/L		<0.0						<0.0			<0.0
NO2 + NO3, diss, mg/L		<0.0						<0.0			<0.0
NO2, diss, mg/L		0.0200						<0.0			<0.0
NO3, diss, mg/L		<0.0						<0.0			<0.0
OH, mg/L		<0.0						<0.0			<0.0
Pb, diss, mg/L		<0.0						<0.0			<0.0
pH (field), pH	7.030	7.200	7.310	7.260	7.200	7.040	7.270	7.200	7.800		7.000
pH (lab), pH		8.000						8.000			8.000
PO4, tot, mg/L								<0.0			0.0300
PO4, total soluble, mg/L		<0.0									
SAR, ratio		0.450						0.430			0.450
Se, diss, mg/L		<0.0						0.000200			<0.0
SO4, diss, mg/L		1500.						1500.			1610.
Spec. Cond. (field), umhos/cm	3390	3410	3570	3630	3380	3240	3770	4	4		3000
Spec. Cond. (lab), umhos/cm		3100.000						2930.000			2920.000
SS, mL/L/hr		<0.000						<0.000			<0.000
Sulfide, tot, mg/L		<0.0						<0.0			<0.0
Sum Anions, meq/L		41.000						41.000			43.000
Sum Cations, meq/L		43.000						41.000			42.000
TDS (calculated), mg/L		2520.						2480.			2620.
TDS (ratio-measured/calc), rat		1.200						1.130			1.090
TDS, mg/L		3020.						2810.			2850.
Temp (Celcius), degrees C	14.600	11.700	11.400	12.100	9.400	13.400	15.700	16.000	16.80		17.400
U, diss, mg/L		0.00530						0.00510			0.00450
Zn, diss, mg/L		<0.0						<0.0			<0.0

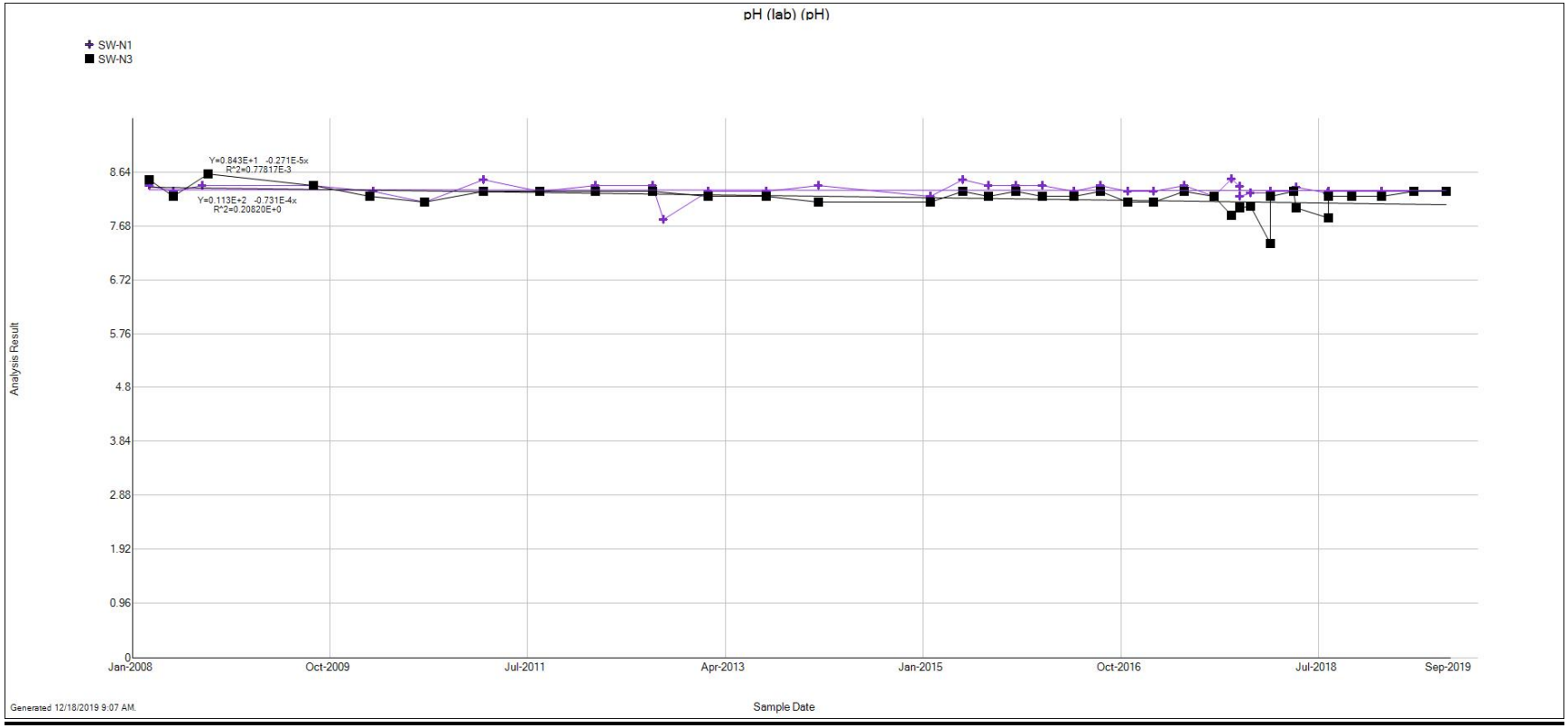
Appendix 2
Surface Water Monitoring Graphs

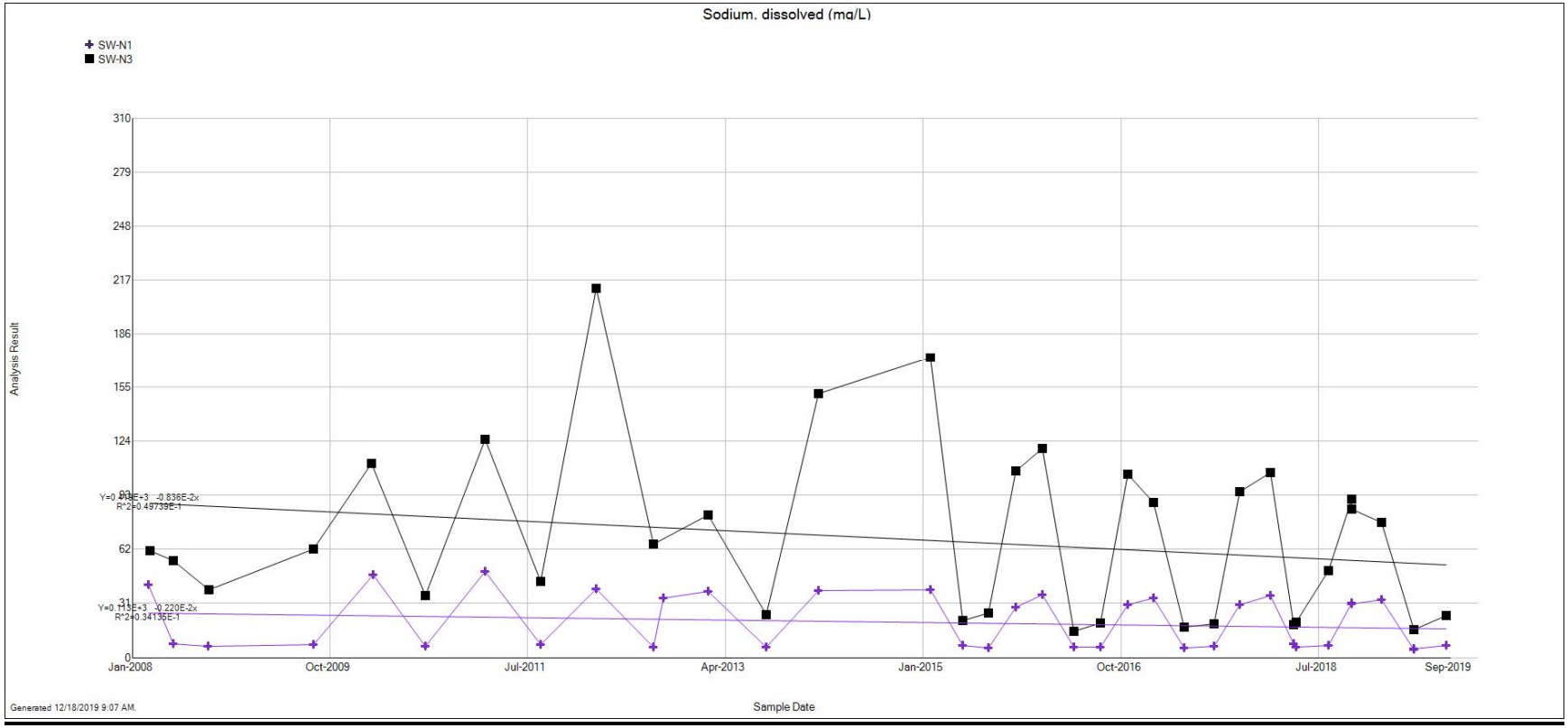

Calcium, dissolved (mg/L)
SW-N1
SW-N3
Analysis Result
590
531
472
413
354
295
236
177
118
59
0
Y=0.132E+3 + 0.303E-2x
R^2=0.92623E-3
Y=0.360E+3 -0.576E-2x
R^2=0.83328E-2
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:07 AM.
Sample Date

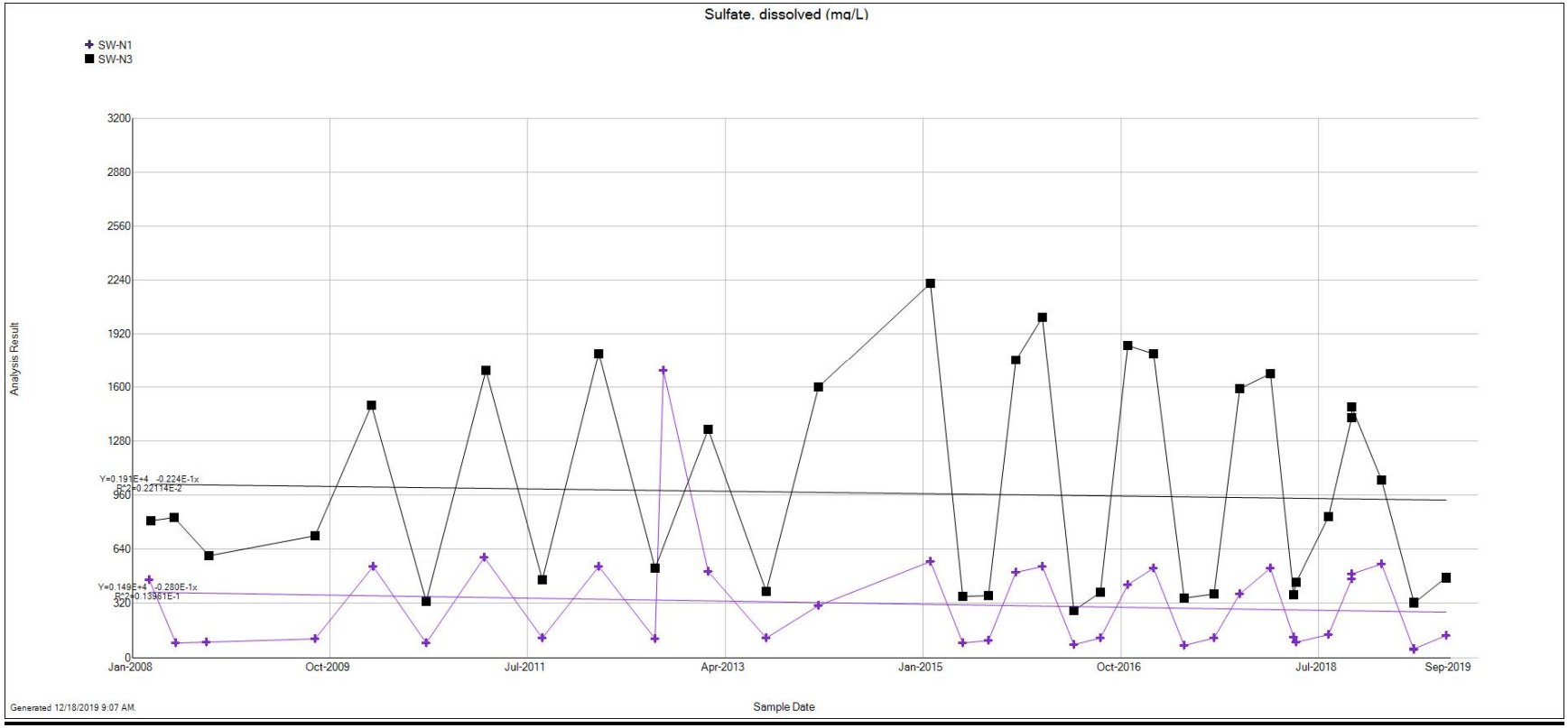

Specific Conductance @ 25C (lab) (umhos/cm)
SW-N1
SW-N3
Analysis Result
4600
4140
3680
3220
2760
2300
1840
1380
920
460
0
Y=0.377E+4 -0.436E-1x
R^2=0.37212E-2
Y=0.309E+4 -0.515E-1x
R^2=0.12305E-1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:07 AM.

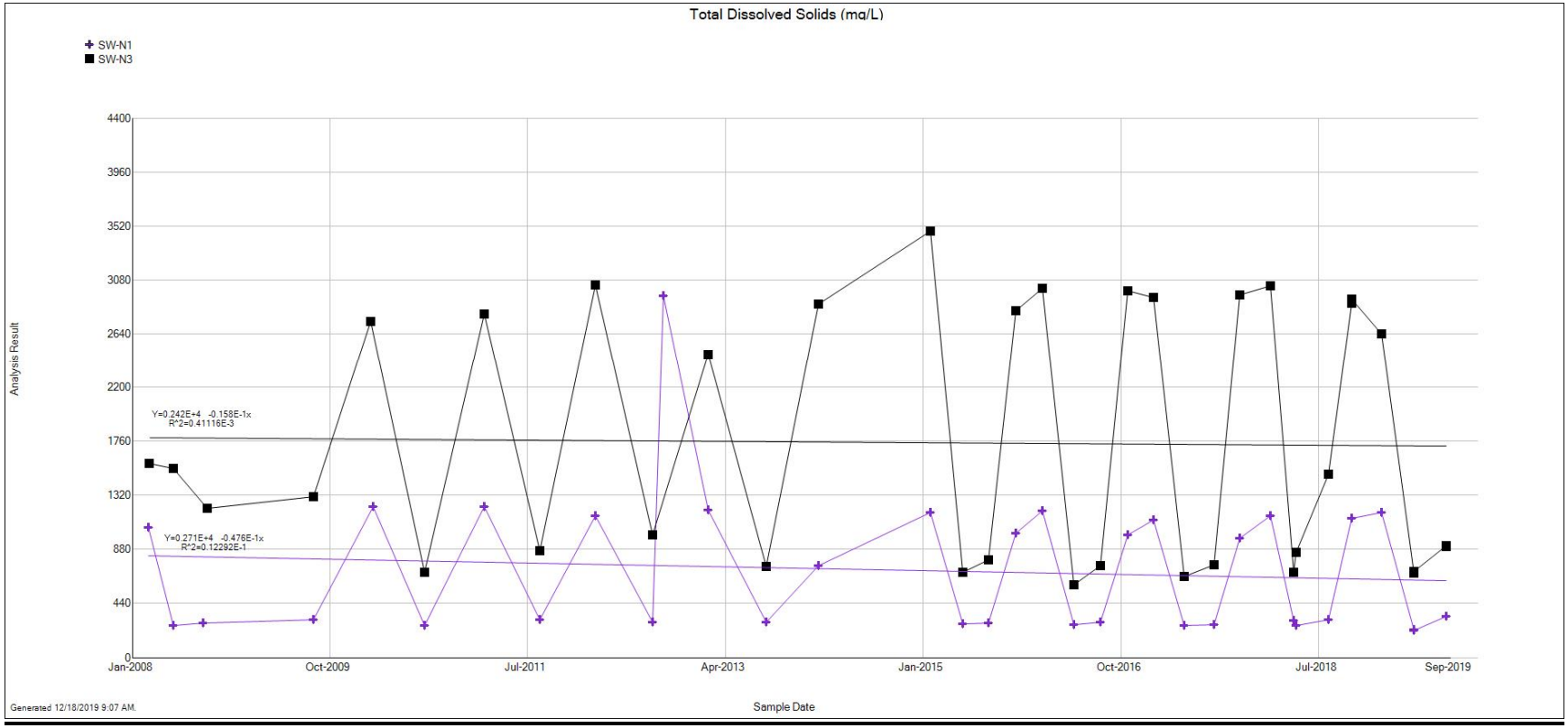

Iron, total recoverable (ug/L)
SW-N1
SW-N3
Analysis Result
8500
7650
6800
5950
5100
4250
3400
2550
1700
850
0
Y=0.145E+5 -0.319E+0x
R^2=0.83802E-1
Y=0.581E+4 -0.115E+0x
R^2=0.21587E-1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:07 AM.

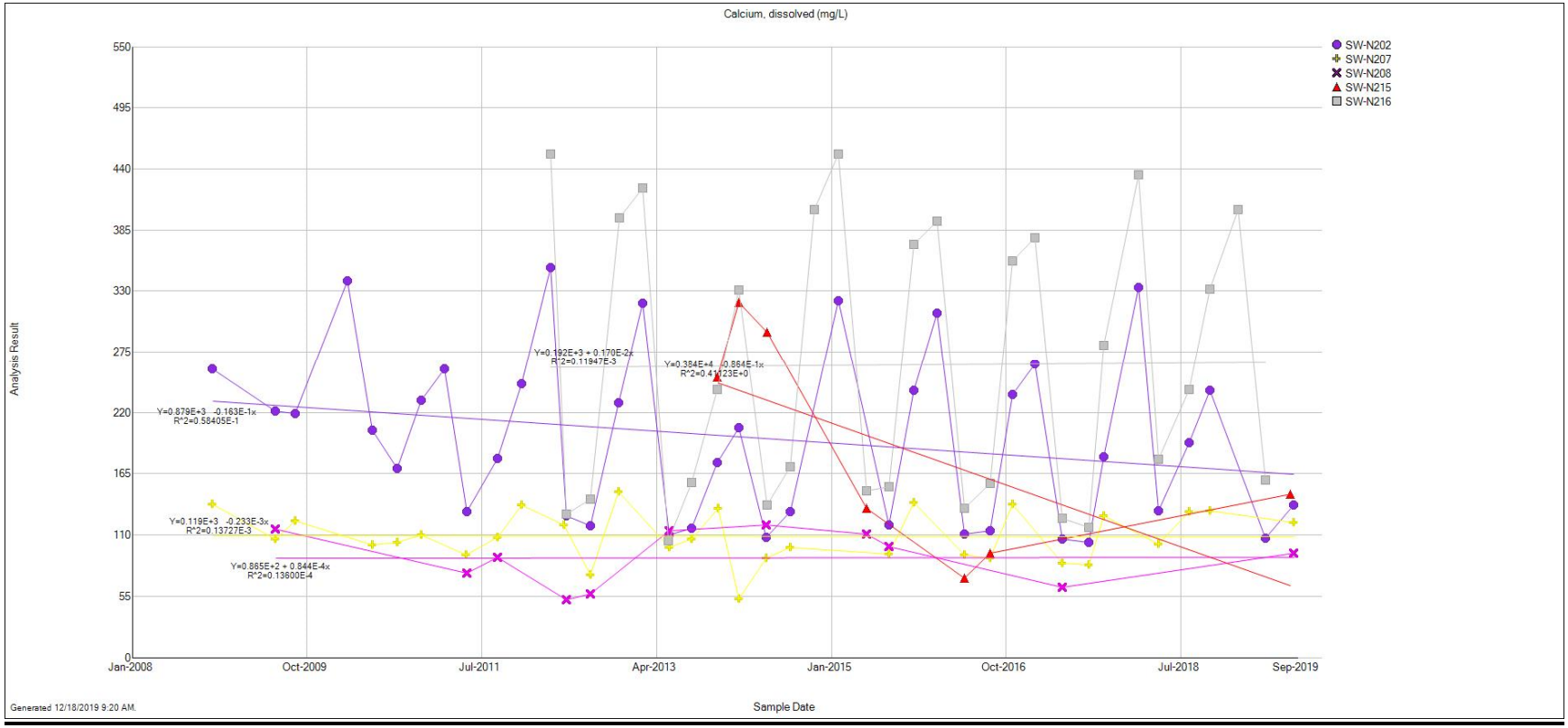

Magnesium, dissolved (mg/L)
SW-N1
SW-N3
Analysis Result
350
315
280
245
210
175
140
105
70
35
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:07 AM.

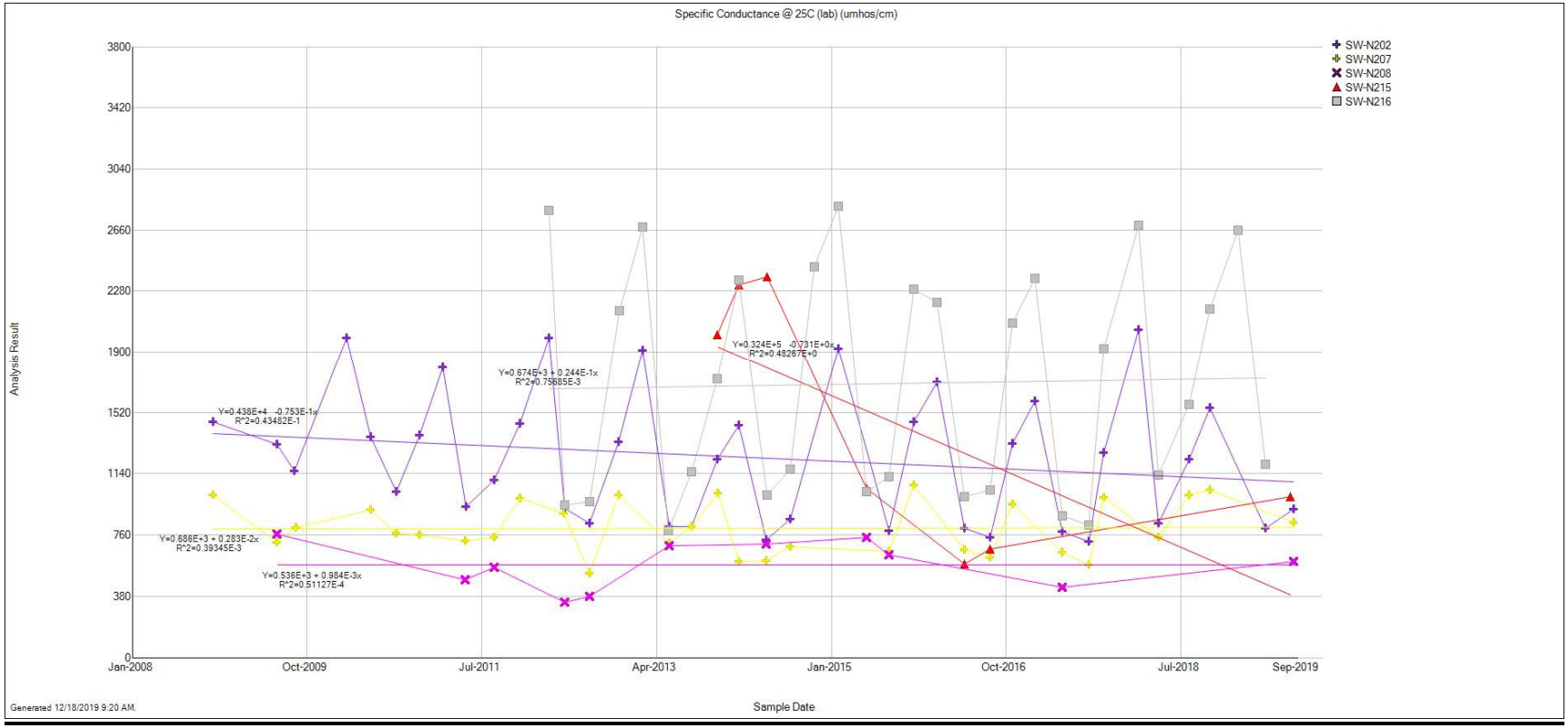

pH (lab) (pH)
SW-N1
SW-N3
Y=0.843E+1 -0.271E-5x
R^2=0.77817E-3
Y=0.113E+2 -0.731E-4x
R^2=0.20820E+0
8.64
7.68
6.72
5.76
4.8
3.84
2.88
1.92
0.96
0
Analysis Result
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:07 AM.

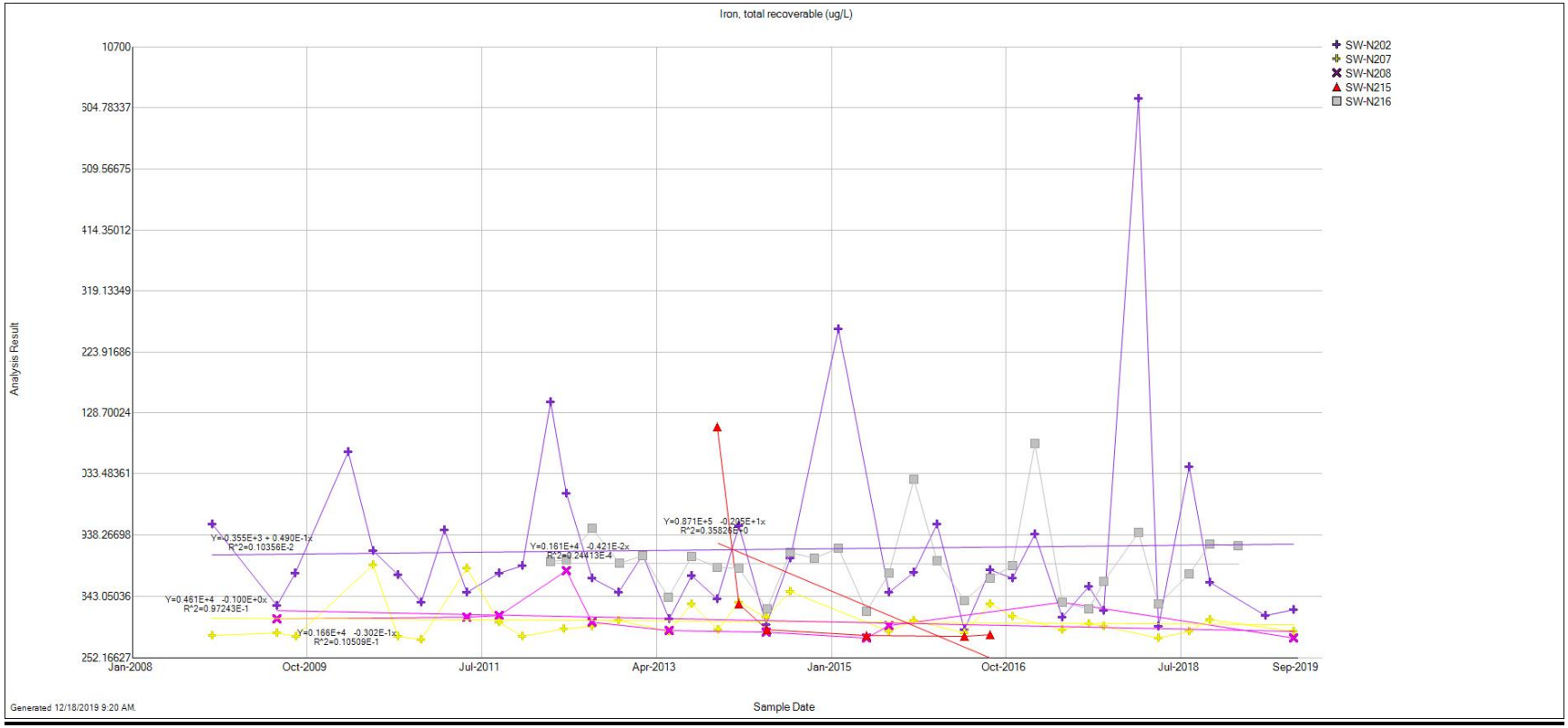

Sodium, dissolved (mg/L)
SW-N1
SW-N3
Analysis Result
310
279
248
217
186
155
124
62
31
0
Y=0.418E+3 -0.836E-2x
R^2=0.49739E-1
Y=0.113E+3 -0.220E-2x
R^2=0.34135E-1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:07 AM.
Sample Date

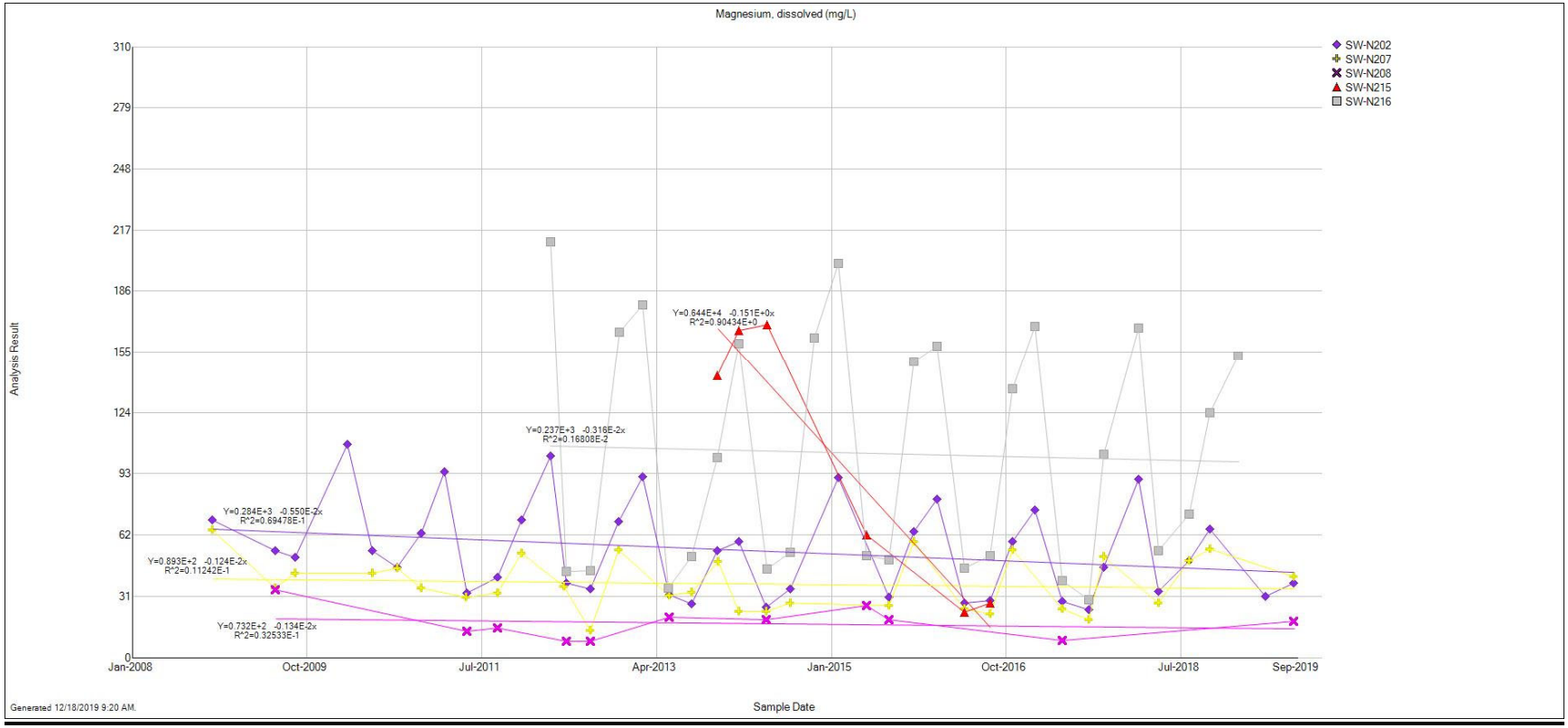

Sulfate, dissolved (mg/L)
SW-N1
SW-N3
Analysis Result
3200
2880
2560
2240
1920
1600
1280
960
640
320
0
Y=0.191E+4 -0.224E-1x
R^2=0.22114E-2
Y=0.149E+4 -0.280E-1x
R^2=0.13381E-1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:07 AM.
Sample Date

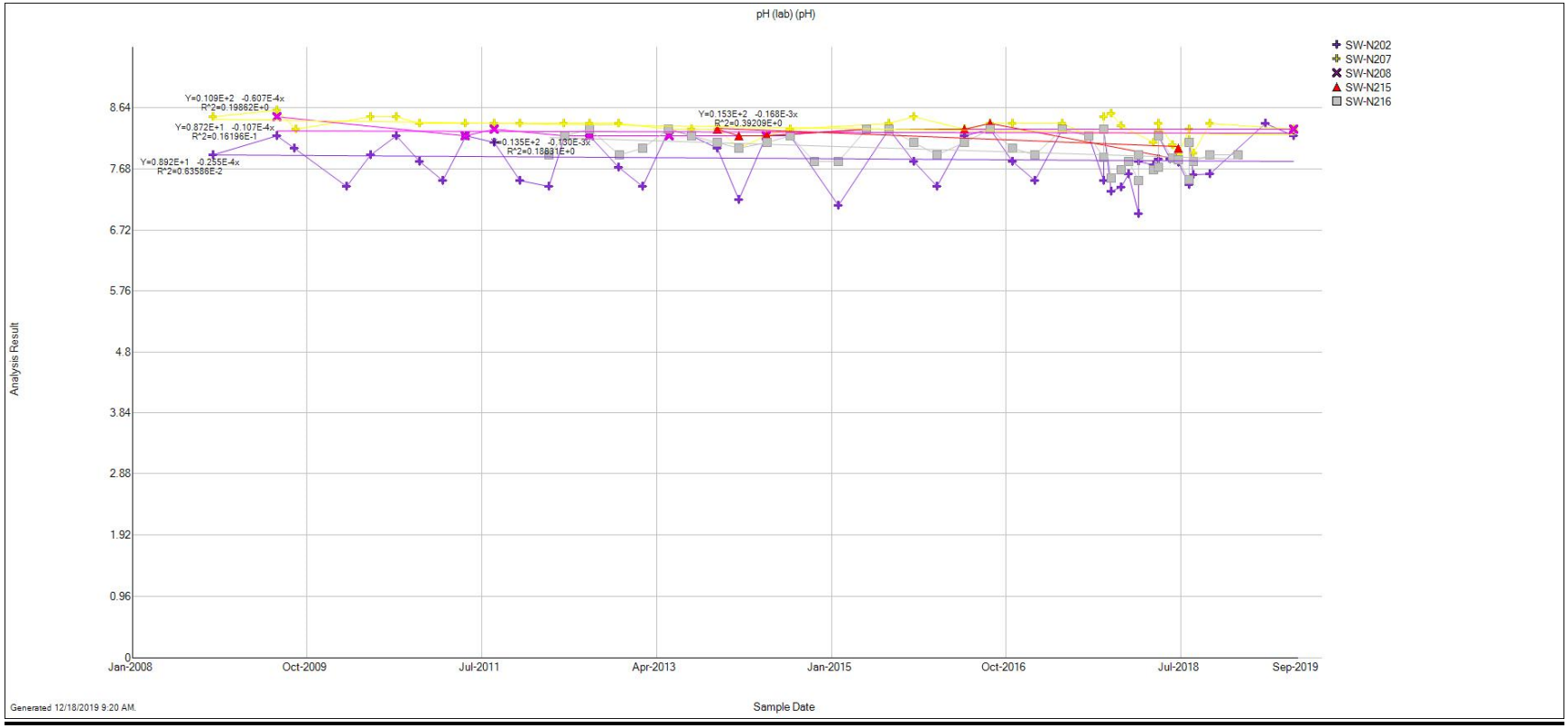

Total Dissolved Solids (mg/L)
SW-N1
SW-N3
Analysis Result
4400
3960
3520
3080
2640
2200
1760
1320
880
440
0
Y=0.242E+4 -0.158E-1x
R^2=0.41116E-3
Y=0.271E+4 -0.476E-1x
R^2=0.12292E-1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:07 AM.
Sample Date

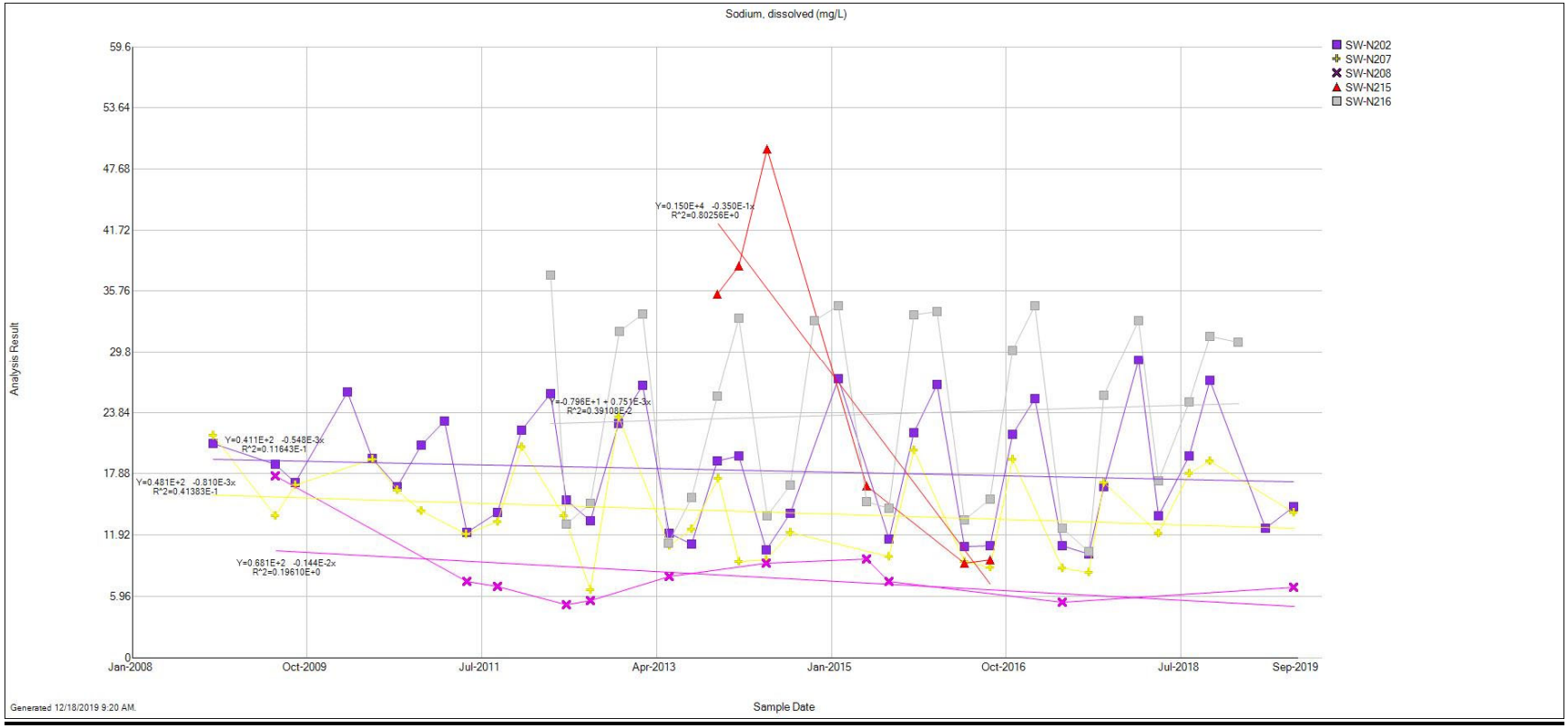

Calcium, dissolved (mg/L)
SW-N202
SW-N207
SW-N208
SW-N215
SW-N216
Analysis Result
550
495
440
385
330
275
220
165
110
55
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Y=0.192E+3 + 0.170E-2x
R^2=0.11947E-3
Y=0.384E+4 -0.864E-1x
R^2=0.4
Y=0.879E+3 -0.163E-1x
R^2=0.58405E-1
Y=0.119E+3 -0.233E-3x
R^2=0.13727E-3
Y=0.865E+2 + 0.844E-4x
R^2=0.13600E-4
Generated 12/18/2019 9:20 AM.
Sample Date

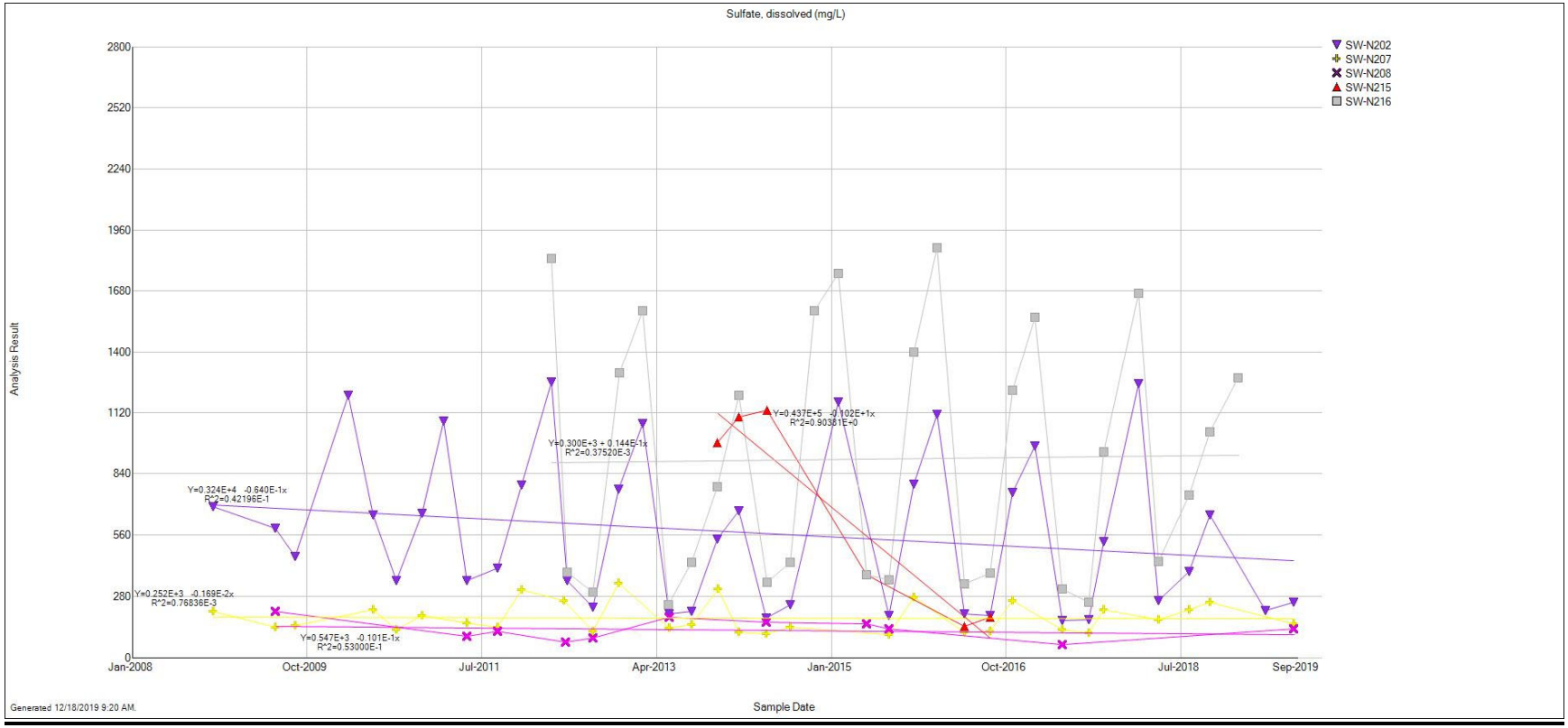

Specific Conductance @ 25C (lab) (umhos/cm)
Analysis Result
3800
3420
3040
2660
2280
1900
1520
1140
760
380
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
SW-N202
SW-N207
SW-N208
SW-N215
SW-N216
Y=0.438E+4 -0.753E-1x
R^2=0.43482E-1
Y=0.674E-3 + 0.244E-1x
R^2=0.75885E-3
Y=0.324E+5 -0.731E+0x
R^2=0.48267E+0
Y=0.686E+3 + 0.283E-2x
R^2=0.39345E-3
Y=0.536E+3 + 0.984E-3x
R^2=0.51127E-4
Generated 12/18/2019 9:20 AM.

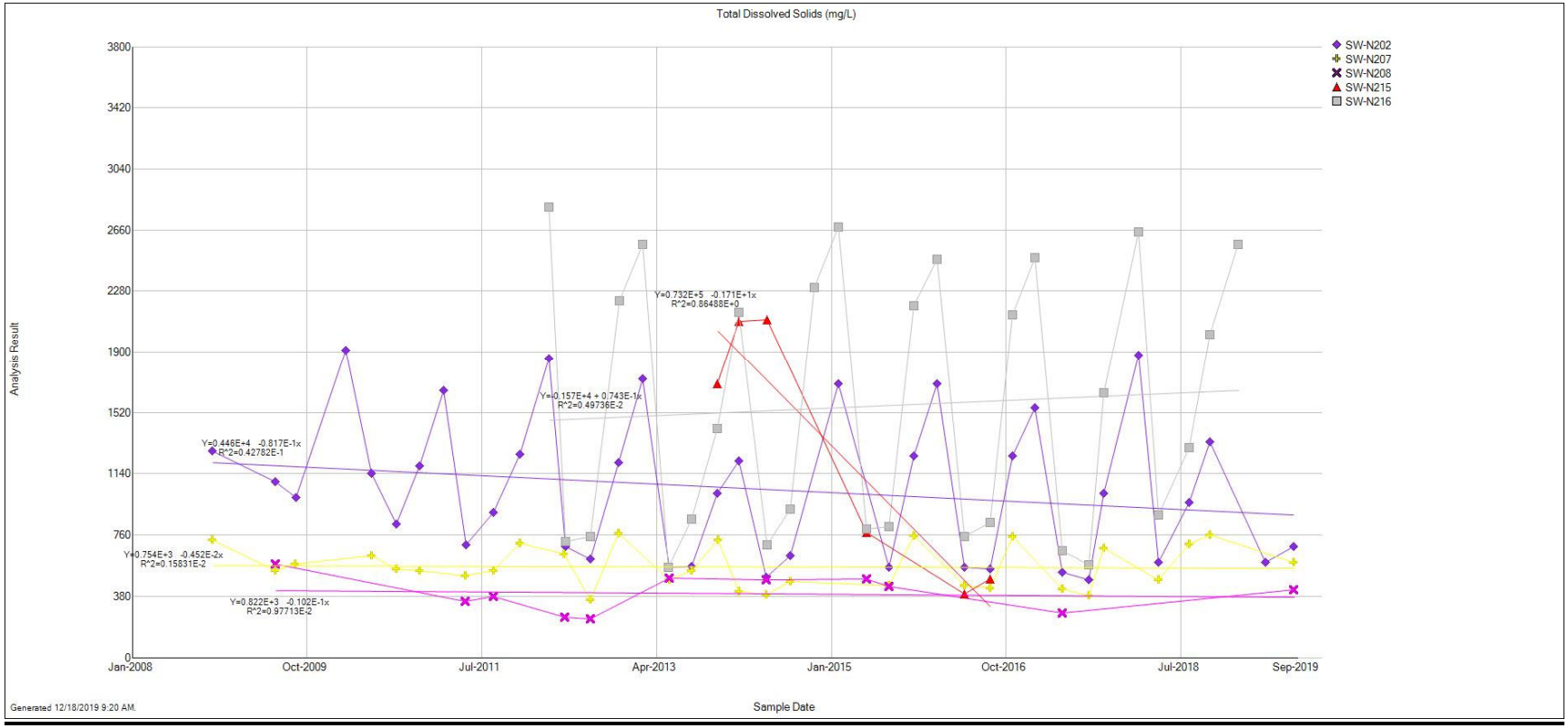

Iron, total recoverable (ug/L)
SW-N202
SW-N207
SW-N208
SW-N215
SW-N216
10700
504.78337
309.56675
414.35012
319.13349
223.91686
128.70024
33.48361
338.26698
343.05036
252.16627
Analysis Result
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Y=0.355E+3 + 0.490E-1x
R^2=0.10356E-2
Y=0.461E+4 -0.100E+0x
R^2=0.97243E-1
Y=0.166E+4 -0.302E-1x
R^2=0.10509E-1
Y=0.161E+4 -0.421E-2x
R^2=0.24413E-4
Y=0.871E+5 -0.205E+1x
R^2=0.35826E-0
Generated 12/18/2019 9:20 AM.

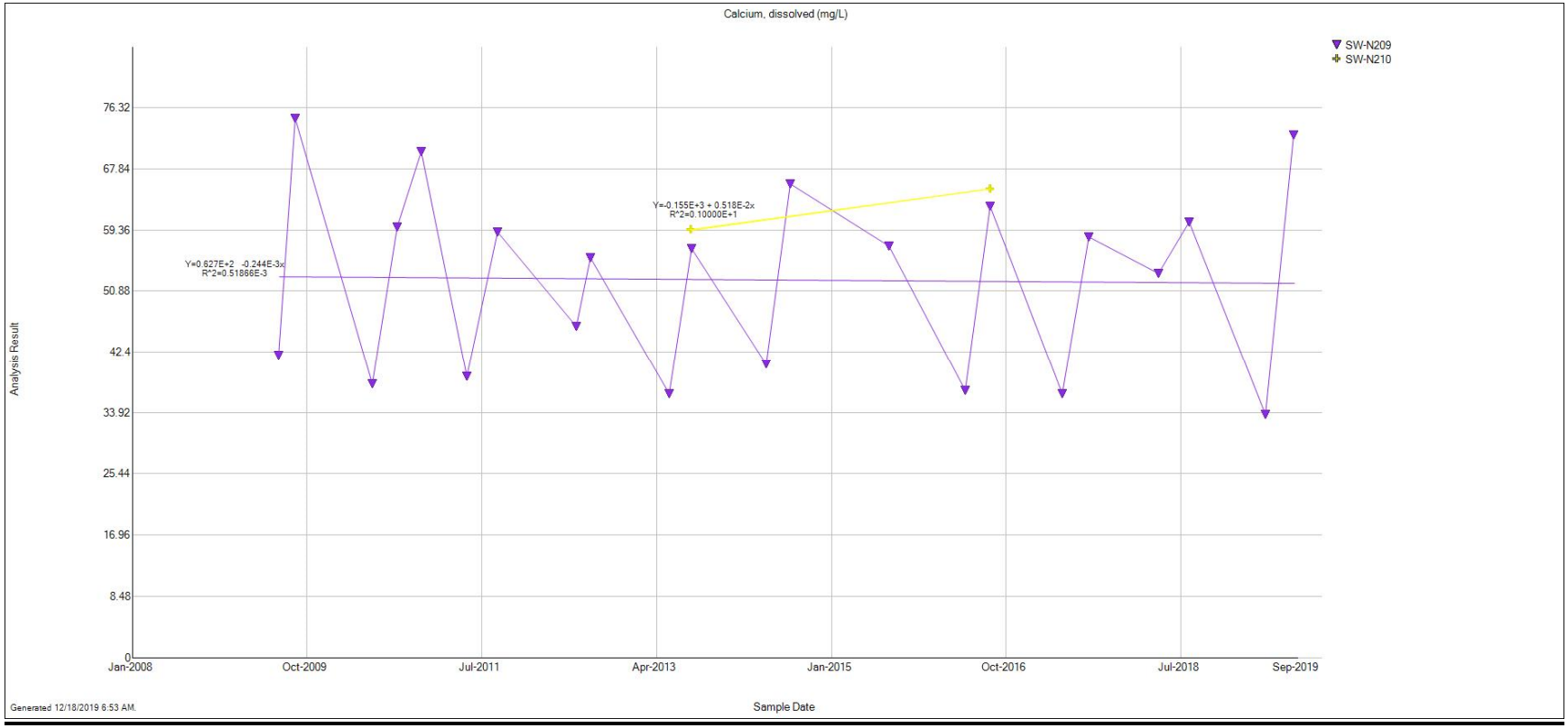

Magnesium, dissolved (mg/L)
Analysis Result
Sample Date
Generated 12/18/2019 9:20 AM.
SW-N202
SW-N207
SW-N208
SW-N215
SW-N216
Y=0.644E+4 -0.151E+0x
R^2=0.90434E+0
Y=0.237E+3 -0.316E-2x
R^2=0.16808E-2
Y=0.284E+3 -0.550E-2x
R^2=0.69478E-1
Y=0.893E+2 -0.124E-2x
R^2=0.11242E-1
Y=0.732E+2 -0.134E-2x
R^2=0.32533E-1
310
279
248
217
186
155
124
93
62
31
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019

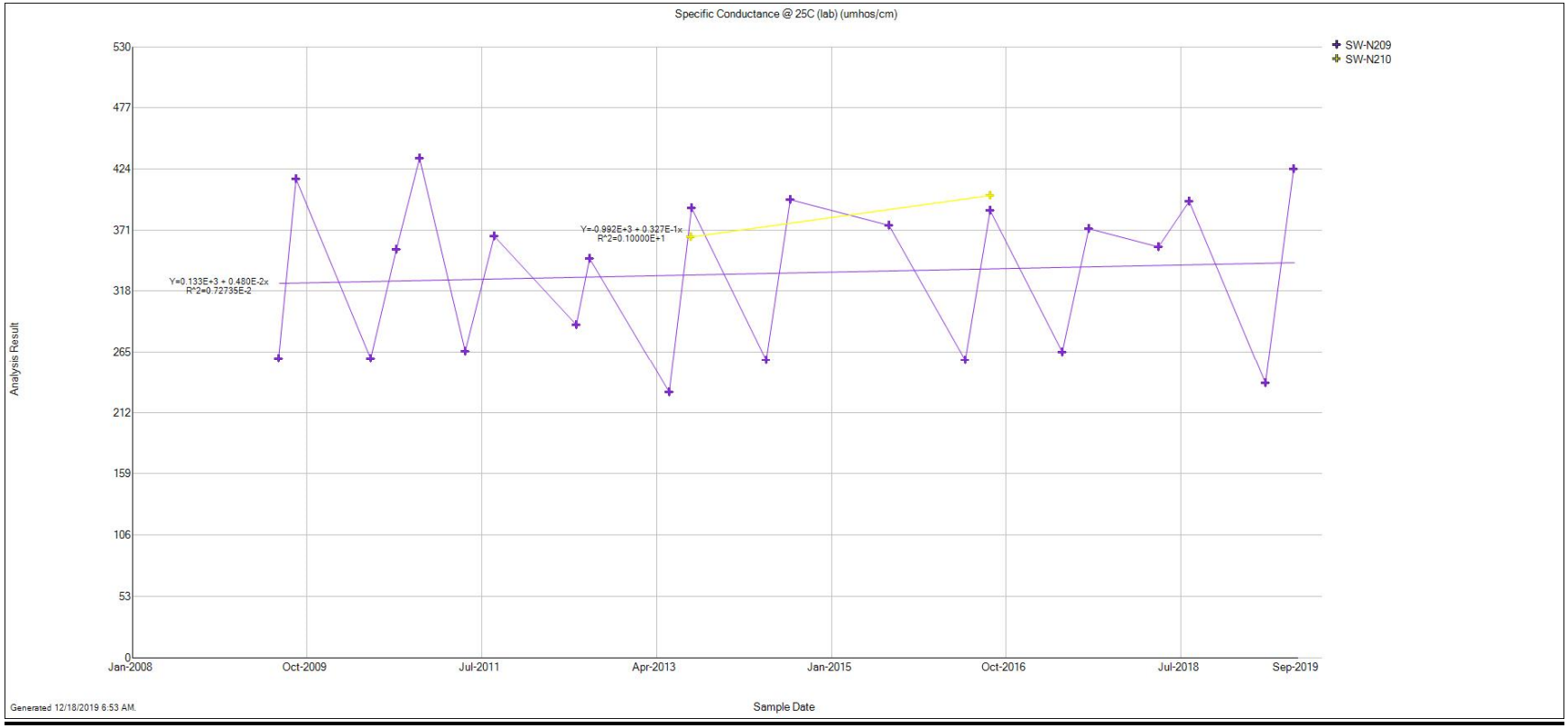

pH (lab) (pH)
Y=0.109E+2 -0.607E-4x
R^2=0.19862E+0
Y=0.872E+1 -0.107E-4x
R^2=0.16196E-1
Y=0.892E+1 -0.255E-4x
R^2=0.63586E-2
Y=0.135E+2 -0.130E-3x
R^2=0.18831E+0
Y=0.153E+2 -0.168E-3x
R^2=0.39209E+0
SW-N202
SW-N207
SW-N208
SW-N215
SW-N216
Analysis Result
8.64
7.68
6.72
5.76
4.8
3.84
2.88
1.92
0.96
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:20 AM.
Sample Date

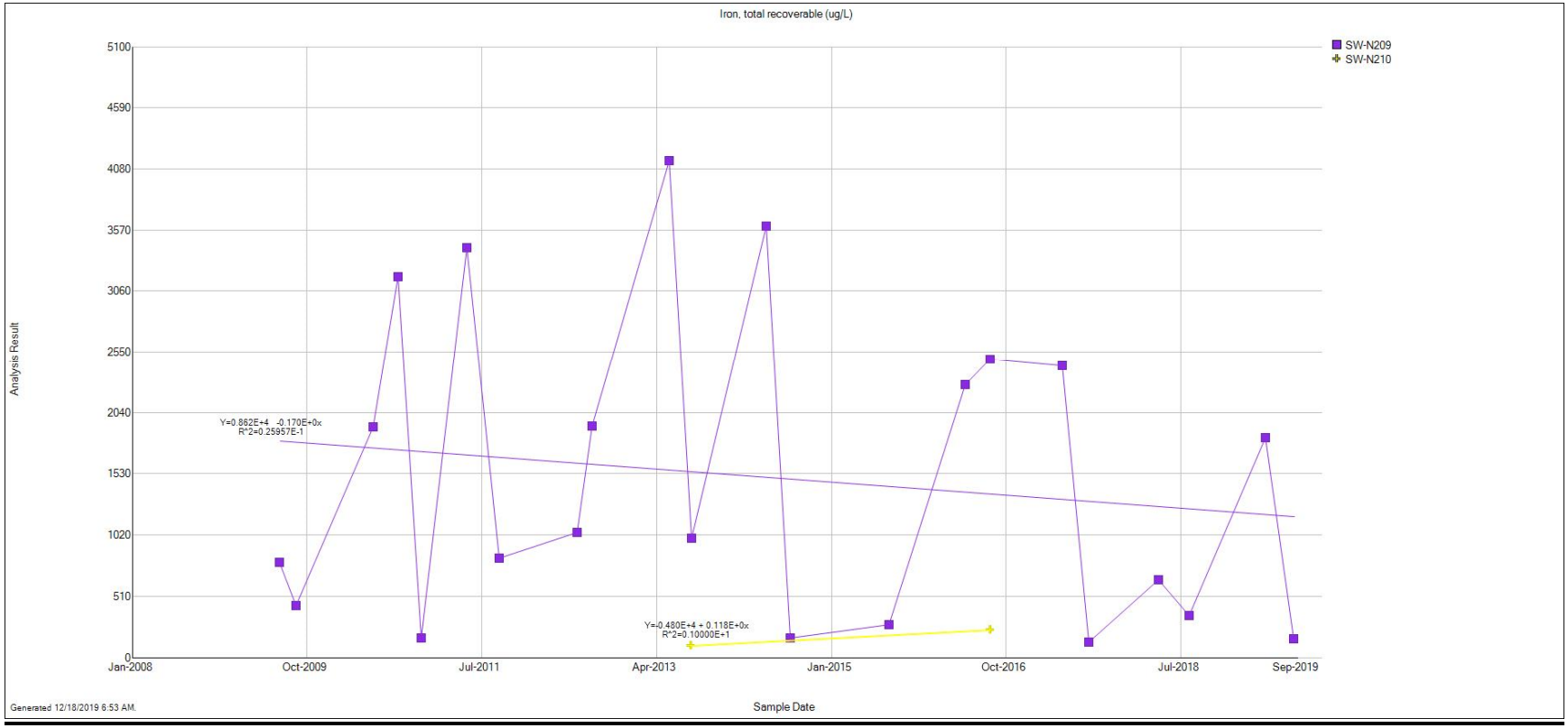

Sodium, dissolved (mg/L)
Analysis Result
59.6
53.64
47.68
41.72
35.76
29.8
23.84
17.88
11.92
5.96
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
SW-N202
SW-N207
SW-N208
SW-N215
SW-N216
Y=0.150E+4 -0.350E-1x
R^2=0.80256E+0
Y=-0.796E+1 + 0.751E-3x
R^2=0.39108E-2
Y=0.411E+2 -0.548E-3x
R^2=0.11643E-1
Y=0.481E+2 -0.810E-3x
R^2=0.41383E-1
Y=0.681E+2 -0.144E-2x
R^2=0.19610E+0
Generated 12/18/2019 9:20 AM.

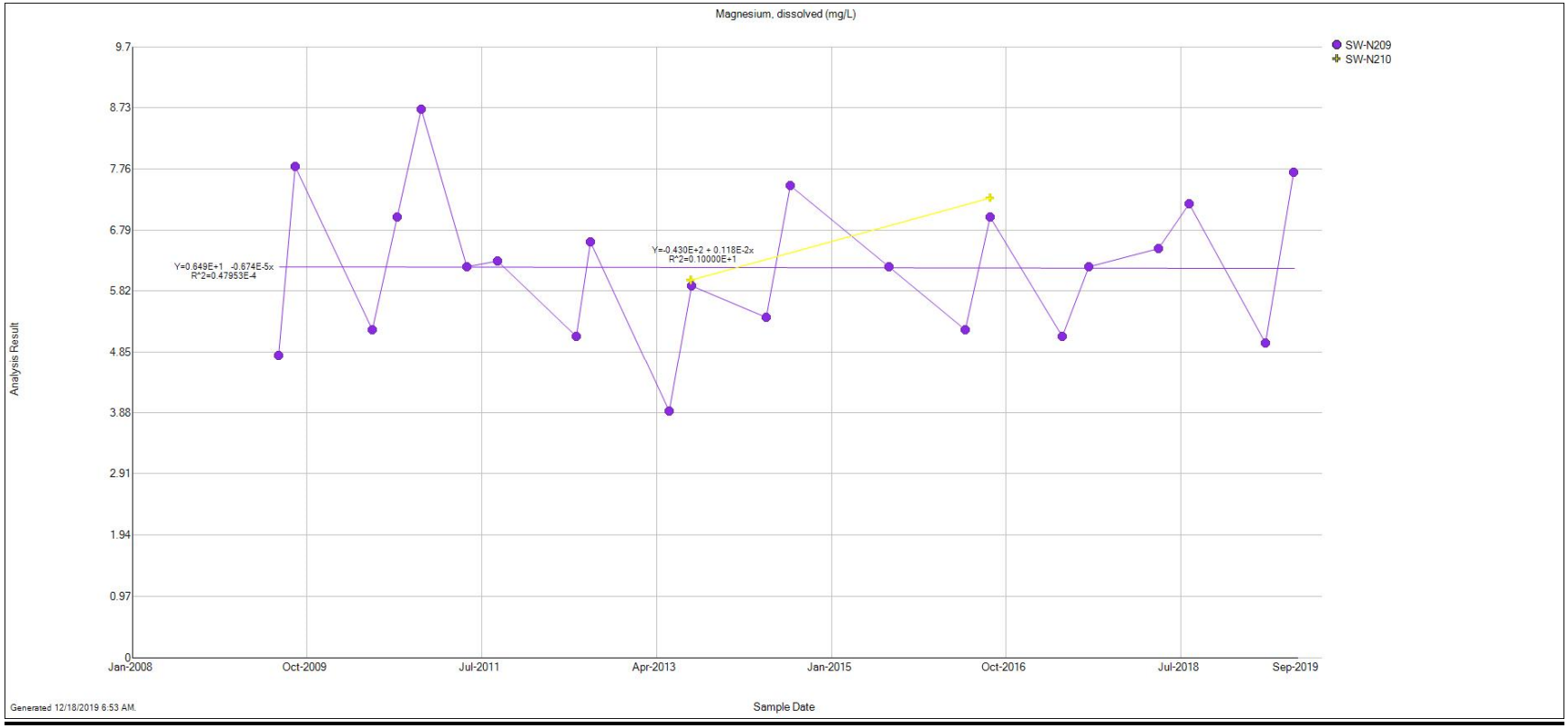

Sulfate, dissolved (mg/L)
SW-N202
SW-N207
SW-N208
SW-N215
SW-N216
Analysis Result
2800
2520
2240
1960
1680
1400
1120
840
560
280
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Y=0.324E+4 -0.640E-1x
R^2=0.42196E-1
Y=0.252E+3 -0.169E-2x
R^2=0.76836E-3
Y=0.547E+3 -0.101E-1x
R^2=0.53000E-1
Y=0.300E+3 + 0.144E-1x
R^2=0.37520E-3
Y=0.437E+5 -0.102E+1x
R^2=0.90381E+0
Generated 12/18/2019 9:20 AM.
Sample Date

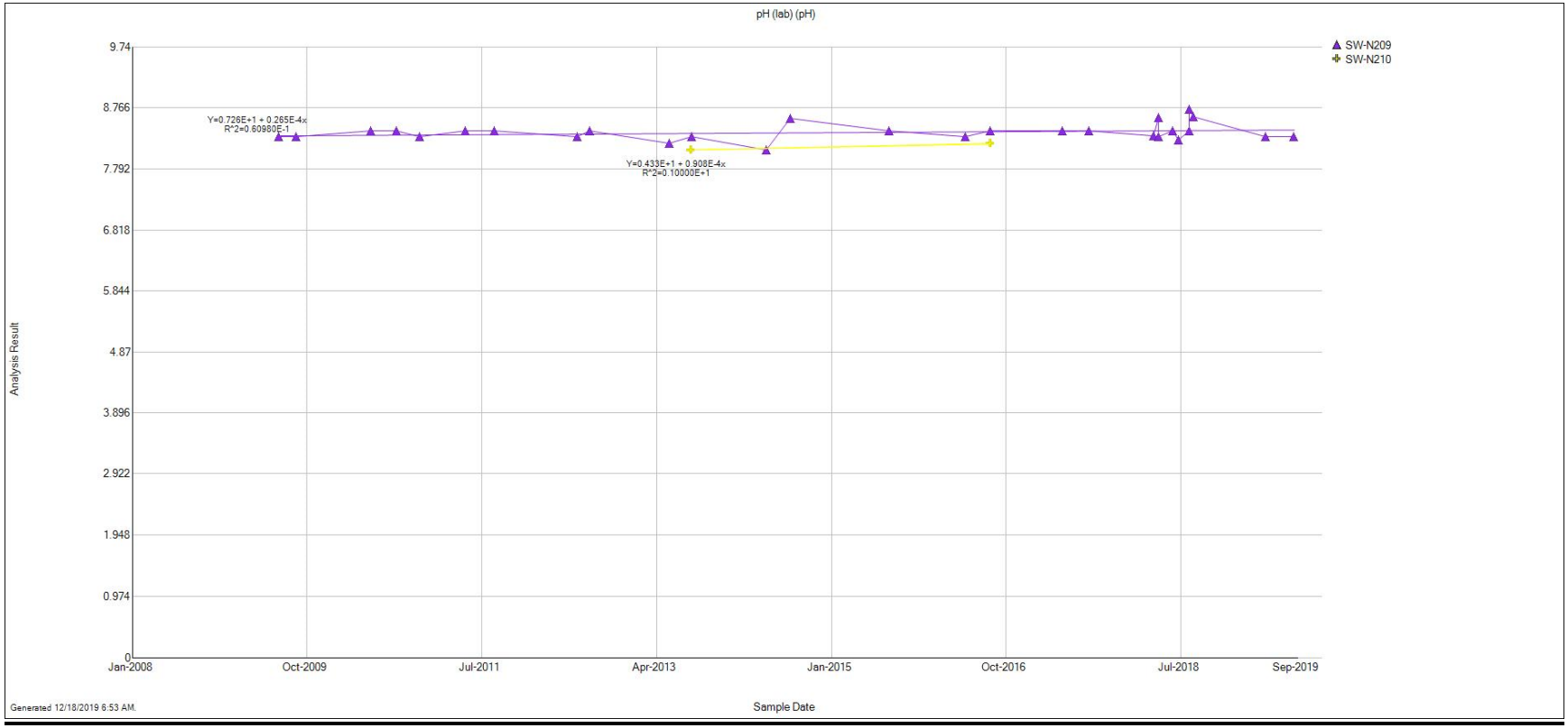

Total Dissolved Solids (mg/L)
Analysis Result
Sample Date
Generated 12/18/2019 9:20 AM.
SW-N202
SW-N207
SW-N208
SW-N215
SW-N216
3800
3420
3040
2660
2280
1900
1520
1140
760
380
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Y=0.446E+4 -0.817E-1x
R^2=0.42782E-1
Y=0.754E+3 -0.452E-2x
R^2=0.15831E-2
Y=0.822E+3 -0.102E-1x
R^2=0.97713E-2
Y=0.157E+4 + 0.743E-1x
R^2=0.49736E-2
Y=0.732E+5 -0.171E+1x
R^2=0.86488E+0

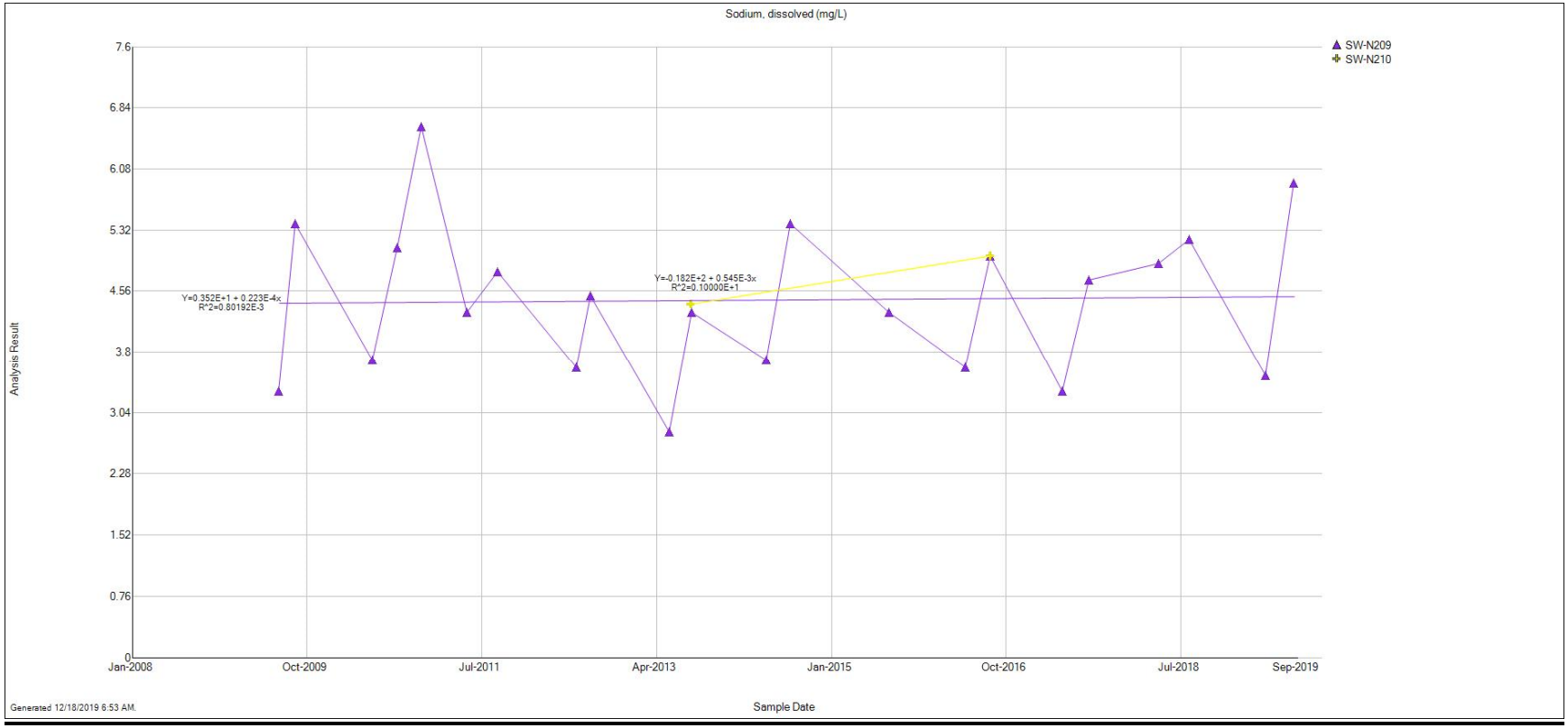

Calcium, dissolved (mg/L)
SW-N209
SW-N210
Y=0.627E+2 -0.244E-3x
R^2=0.51866E-3
Y=-0.155E+3 + 0.518E-2x
R^2=0.10000E+1
76.32
67.84
59.36
50.88
42.4
33.92
25.44
16.96
8.48
0
Analysis Result
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 6:53 AM.

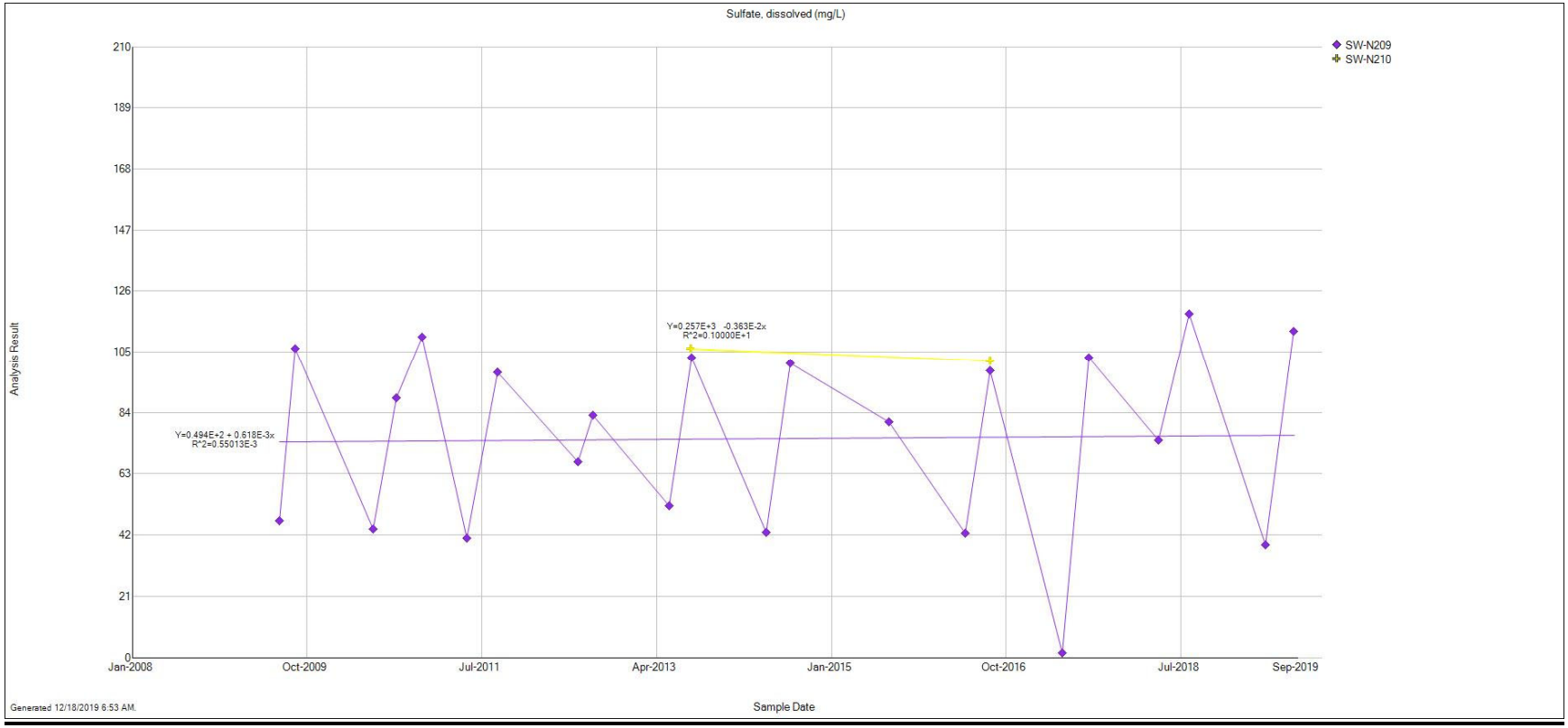

Specific Conductance @ 25C (lab) (umhos/cm)
SW-N209
SW-N210
Y=0.133E+3 + 0.480E-2x
R^2=0.72735E-2
Y=-0.992E+3 + 0.327E-1x
R^2=0.10000E+1
Analysis Result
530
477
424
371
318
265
212
159
106
53
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 6:53 AM.
Sample Date

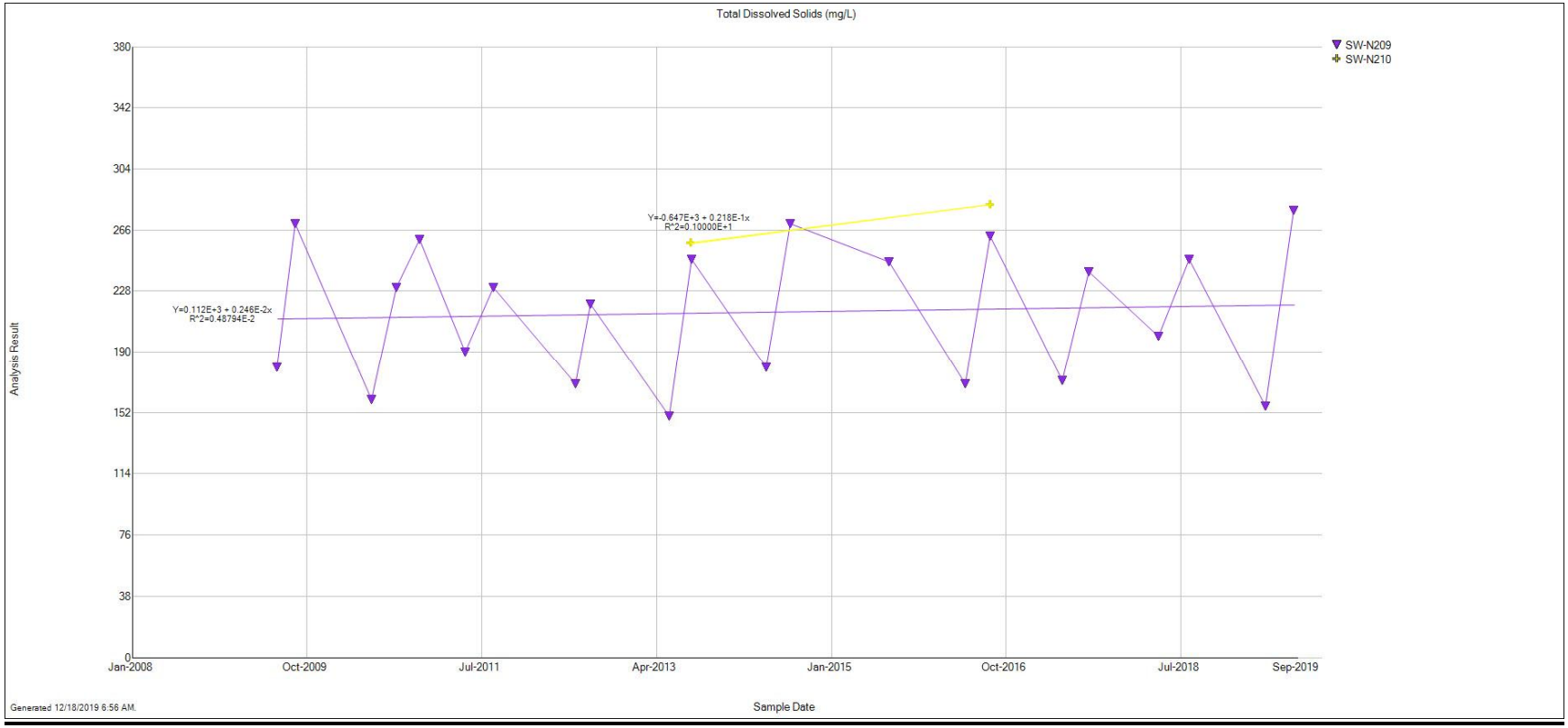

Iron, total recoverable (ug/L)
SW-N209
SW-N210
Analysis Result
5100
4590
4080
3570
3060
2550
2040
1530
1020
510
0
Y=0.862E+4 -0.170E+0x
R^2=0.25957E-1
Y=-0.480E+4 + 0.118E+0x
R^2=0.10000E+1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 6:53 AM.
Sample Date

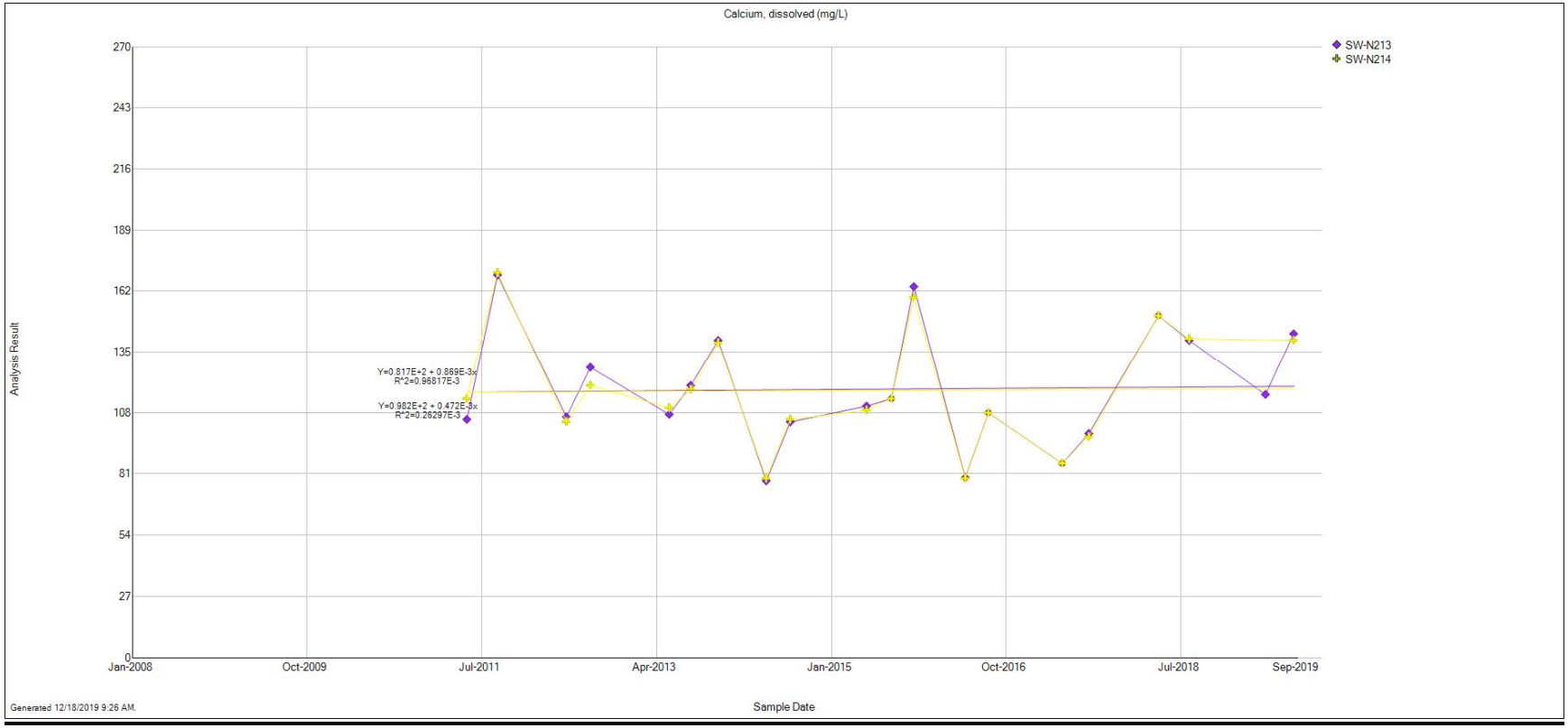

Magnesium, dissolved (mg/L)
SW-N209
SW-N210
Y=0.649E+1 -0.674E-5x
R^2=0.47953E-4
Y=-0.430E+2 + 0.118E-2x
R^2=0.10000E+1
9.7
8.73
7.76
6.79
5.82
4.85
3.88
2.91
1.94
0.97
0
Analysis Result
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 6:53 AM.

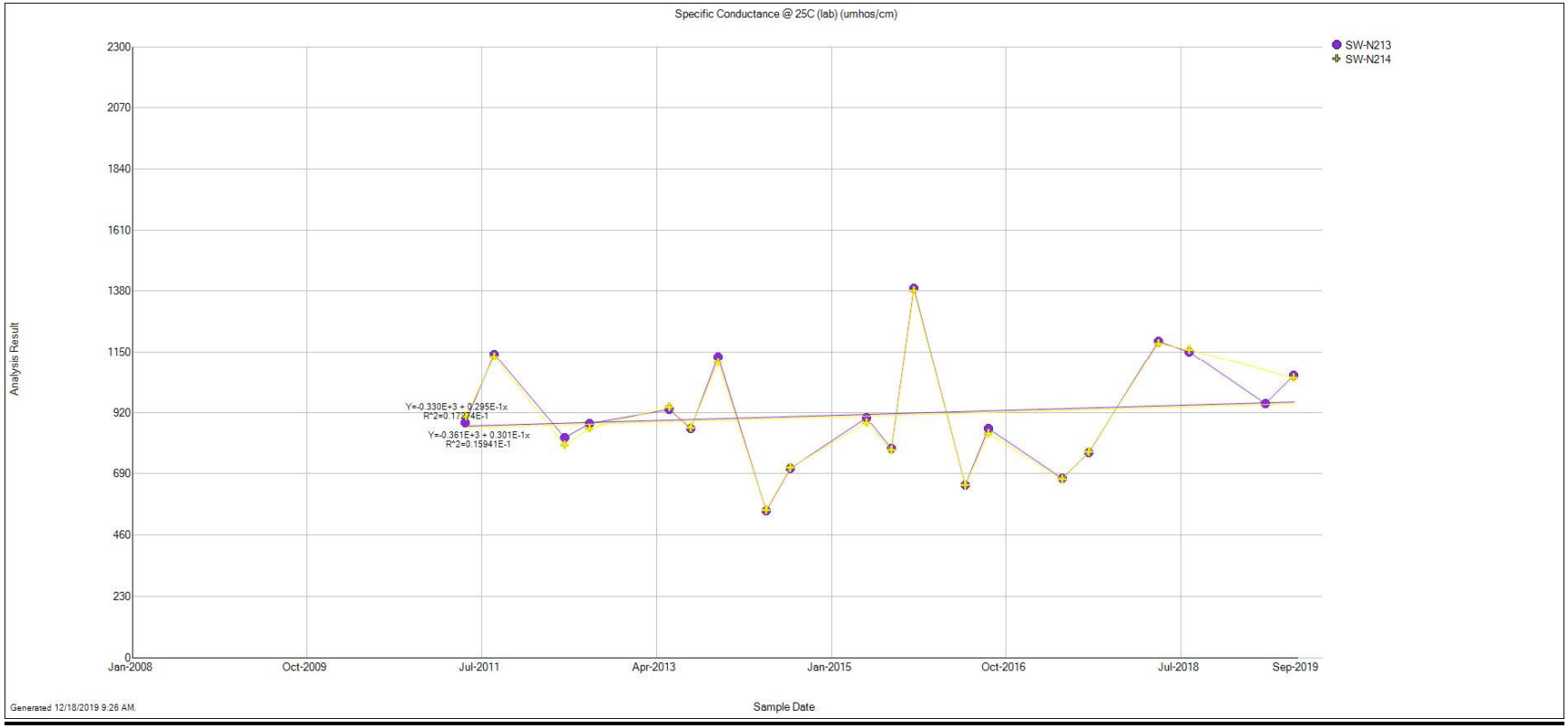

pH (lab) (pH)
SW-N209
SW-N210
Y=0.726E+1 + 0.265E-4x
R^2=0.60980E-1
Y=0.433E+1 + 0.908E-4x
R^2=0.10000E+1
9.74
8.766
7.792
6.818
5.844
4.87
3.896
2.922
1.948
0.974
0
Analysis Result
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 6:53 AM.

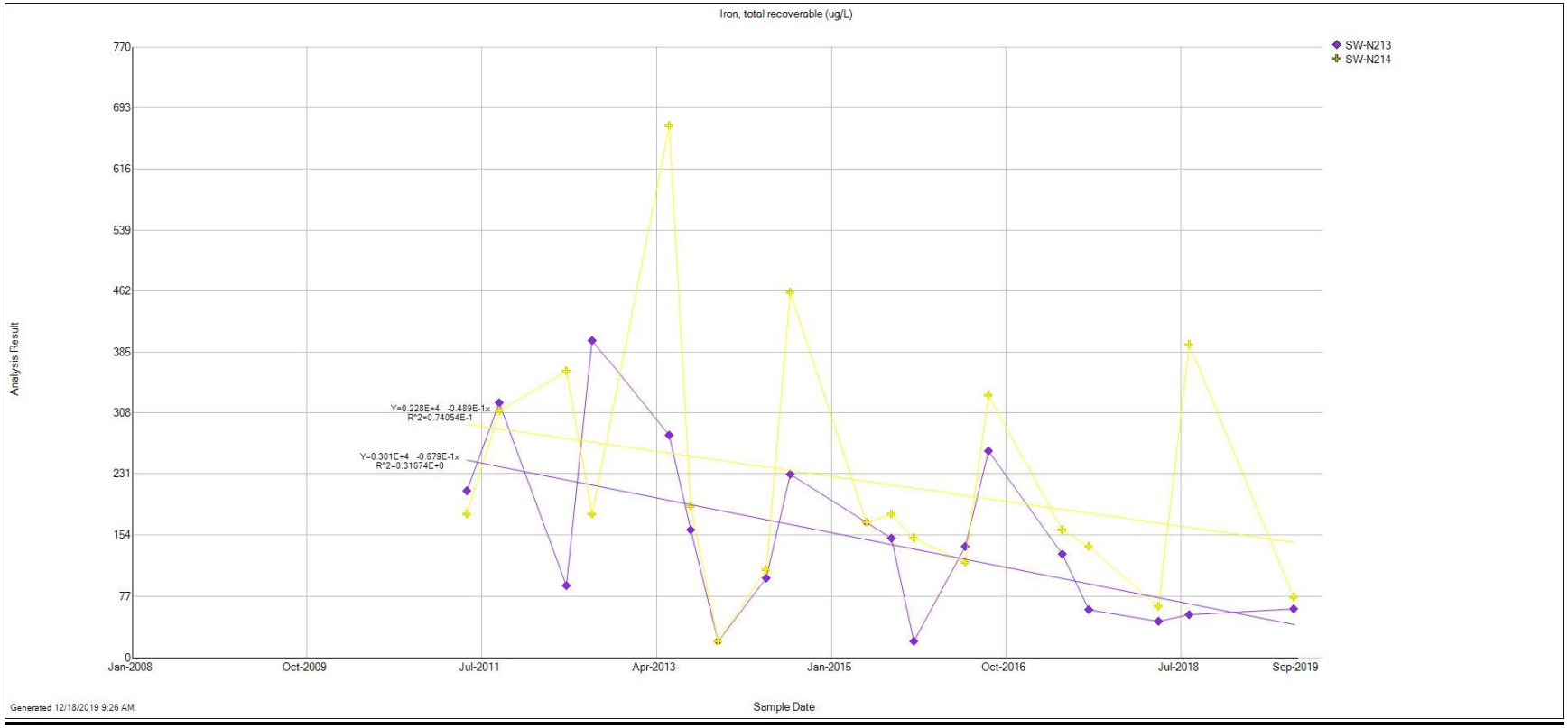

Sodium, dissolved (mg/L)
SW-N209
SW-N210
Y=0.352E+1 + 0.223E-4x
R^2=0.80192E-3
Y=-0.182E+2 + 0.545E-3x
R^2=0.10000E+1
Analysis Result
7.6
6.84
6.08
5.32
4.56
3.8
3.04
2.28
1.52
0.76
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 6:53 AM.
Sample Date

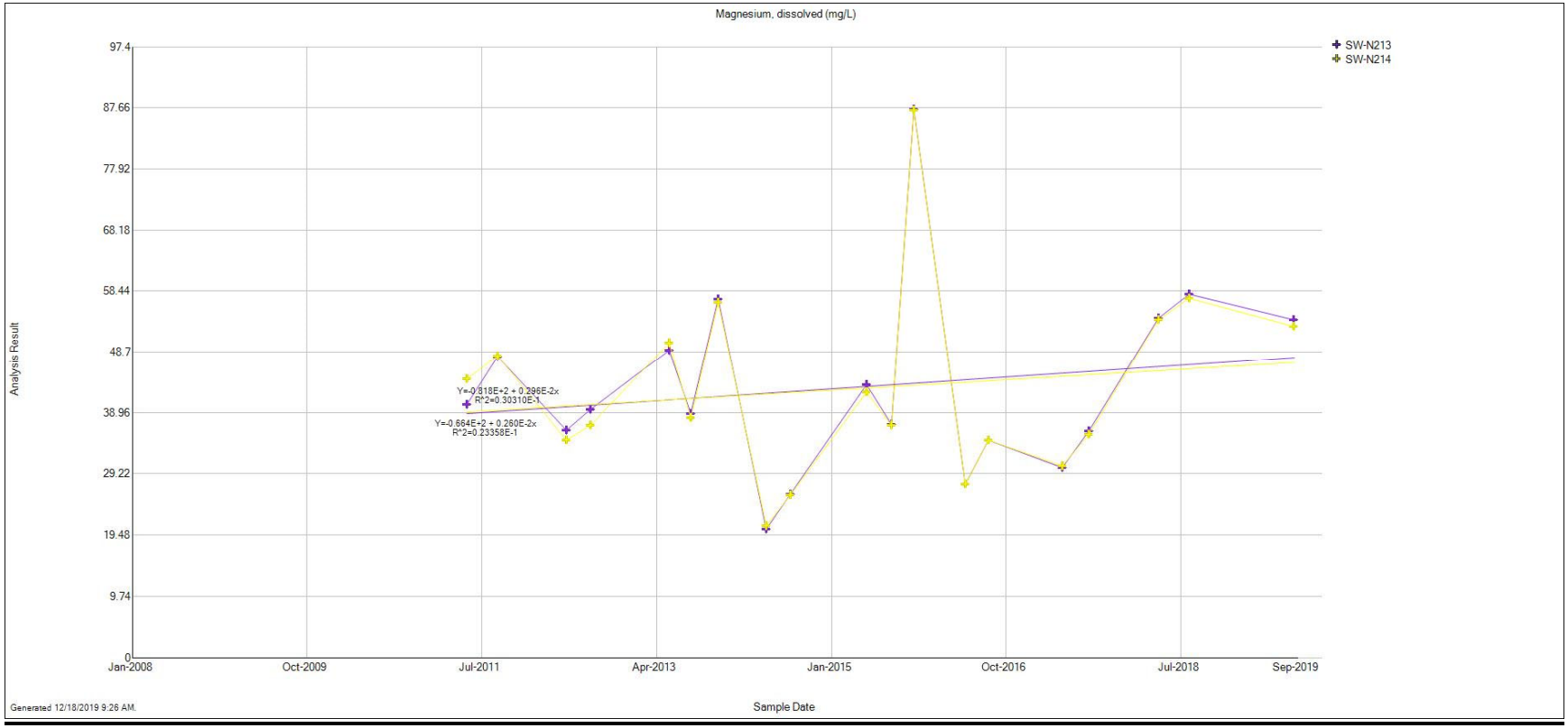

Sulfate, dissolved (mg/L)
SW-N209
SW-N210
Y=0.257E+3 -0.363E-2x
R^2=0.10000E+1
Y=0.494E+2 + 0.618E-3x
R^2=0.55013E-3
Analysis Result
210
189
168
147
126
105
84
63
42
21
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 6:53 AM.
Sample Date

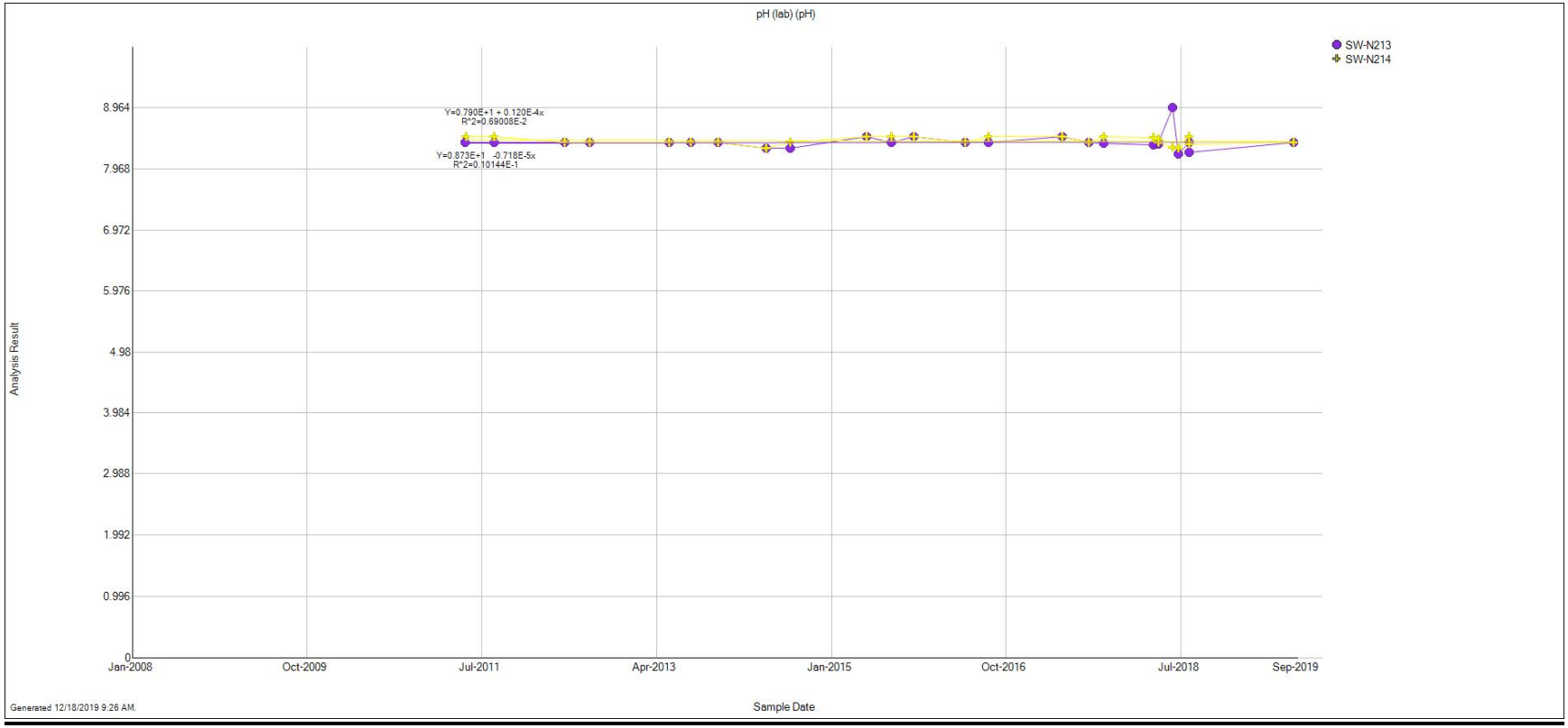

Total Dissolved Solids (mg/L)
SW-N209
SW-N210
Y=-0.647E+3 + 0.218E-1x
R^2=0.10000E+1
Y=0.112E+3 + 0.246E-2x
R^2=0.48794E-2
Analysis Result
380
342
304
266
228
190
152
114
76
38
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 6:56 AM.
Sample Date

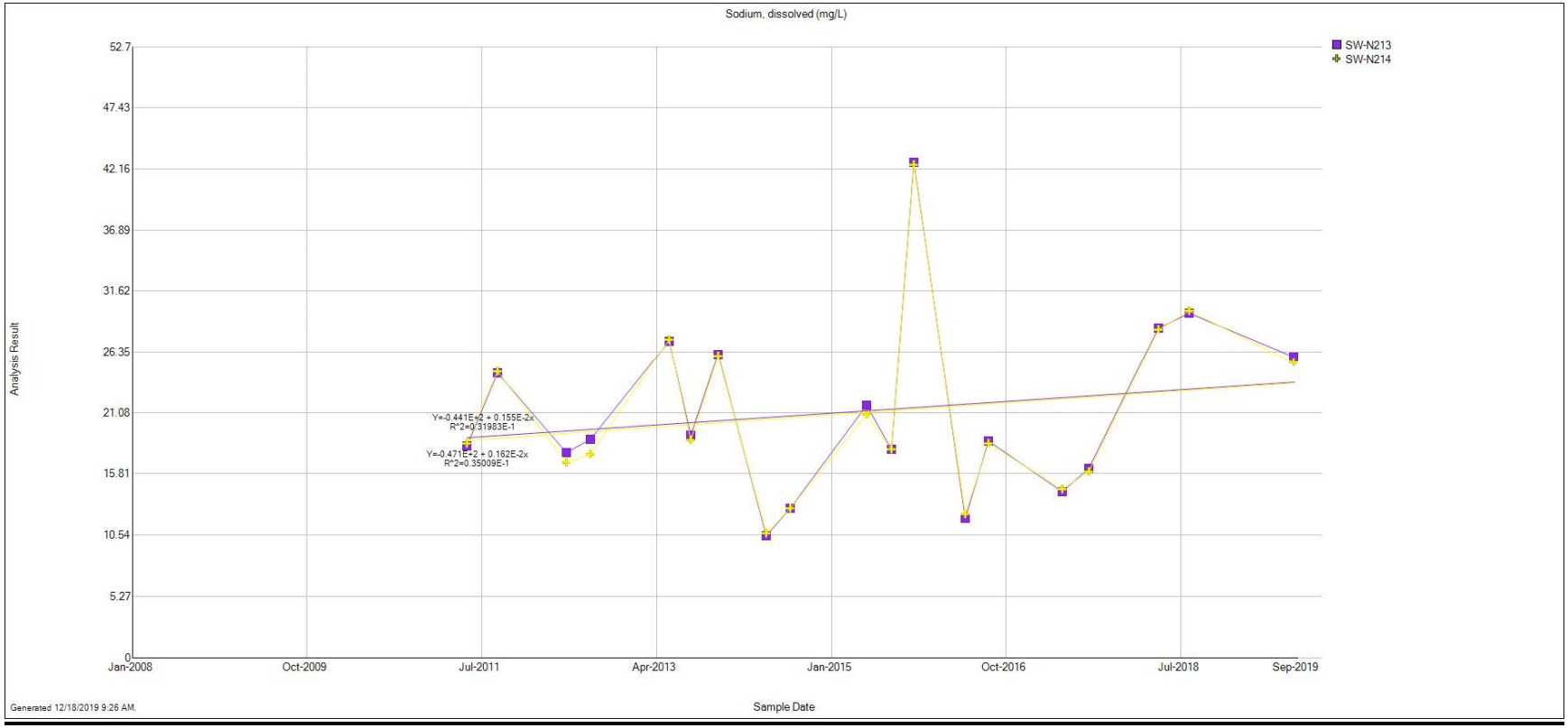

Calcium, dissolved (mg/L)
SW-N213
SW-N214
Analysis Result
270
243
216
189
162
135
108
81
54
27
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Y=0.817E+2 + 0.869E-3x
R^2=0.96817E-3
Y=0.982E+2 + 0.472E-3x
R^2=0.26297E-3
Generated 12/18/2019 9:26 AM.
Sample Date

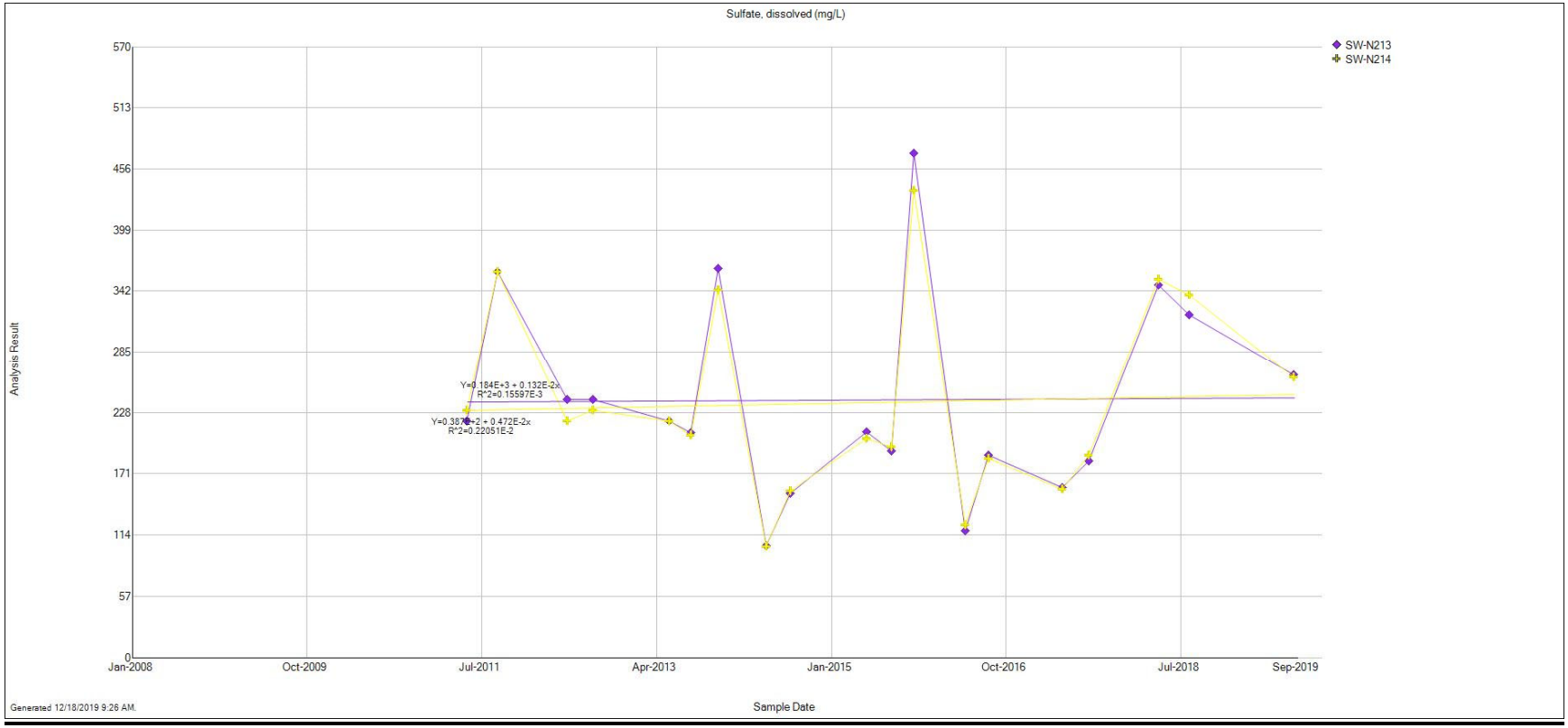

Specific Conductance @ 25C (lab) (umhos/cm)
SW-N213
SW-N214
Analysis Result
2300
2070
1840
1610
1380
1150
920
690
460
230
0
Y=-0.330E+3 + 0.295E-1x
R^2=0.17274E-1
Y=-0.361E+3 + 0.301E-1x
R^2=0.15941E-1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:26 AM.
Sample Date

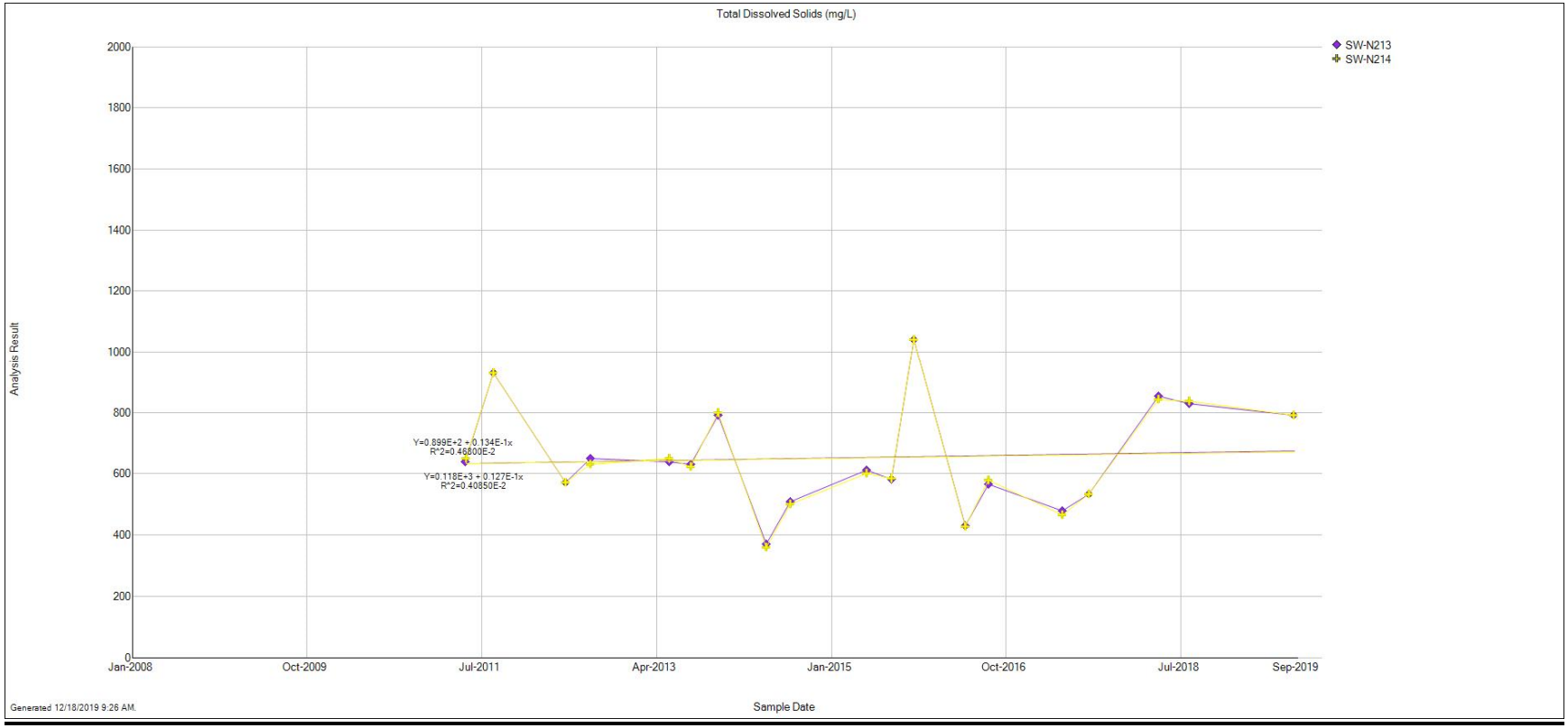

Iron, total recoverable (ug/L)
SW-N213
SW-N214
Y=0.228E+4 -0.489E-1x
R^2=0.74054E-1
Y=0.301E+4 -0.679E-1x
R^2=0.31674E+0
Analysis Result
770
693
616
539
462
385
308
231
154
77
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:26 AM.
Sample Date

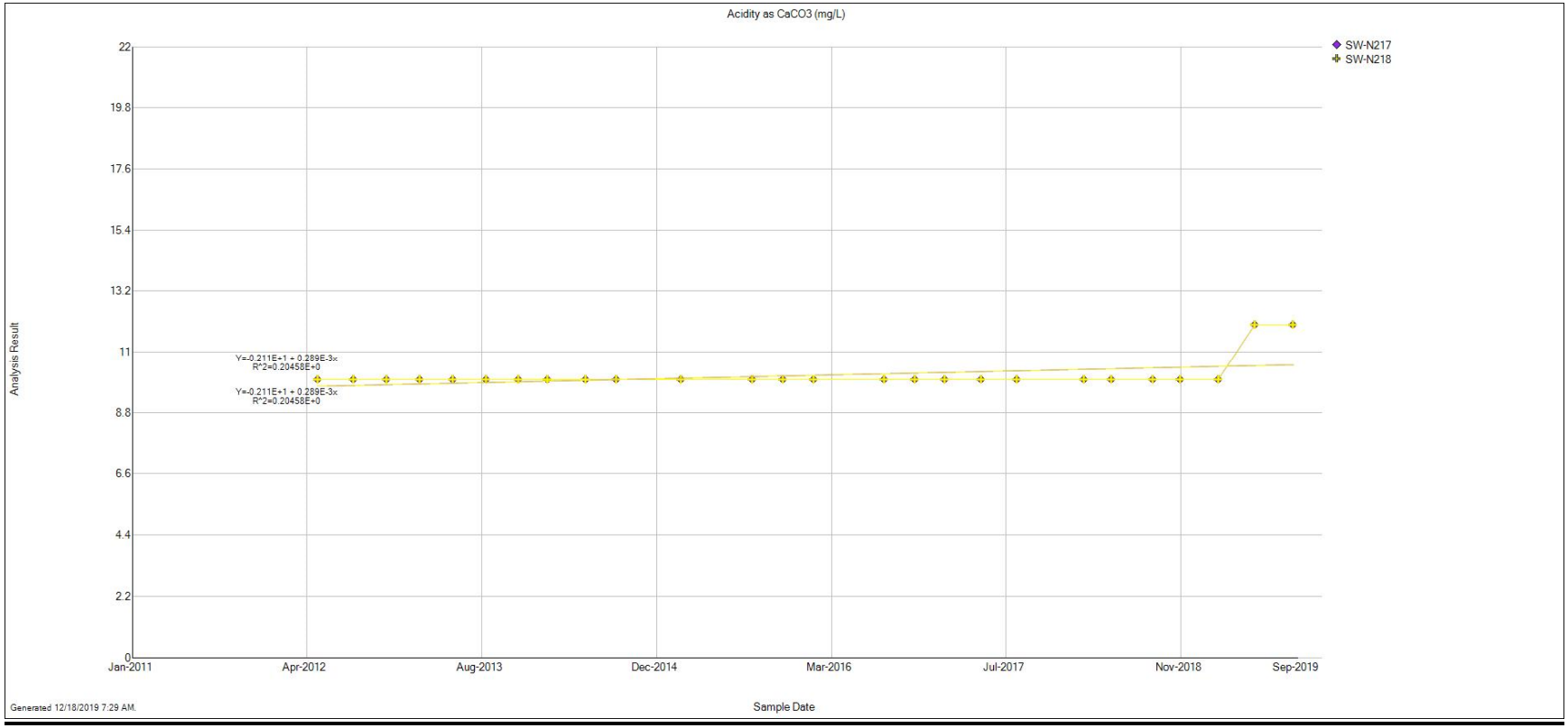

Magnesium, dissolved (mg/L)
SW-N213
SW-N214
97.4
87.66
77.92
68.18
58.44
48.7
38.96
29.22
19.48
9.74
0
Analysis Result
Y=-0.818E+2 + 0.296E-2x
R^2=0.30310E-1
Y=-0.664E+2 + 0.260E-2x
R^2=0.23358E-1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:26 AM.
Sample Date

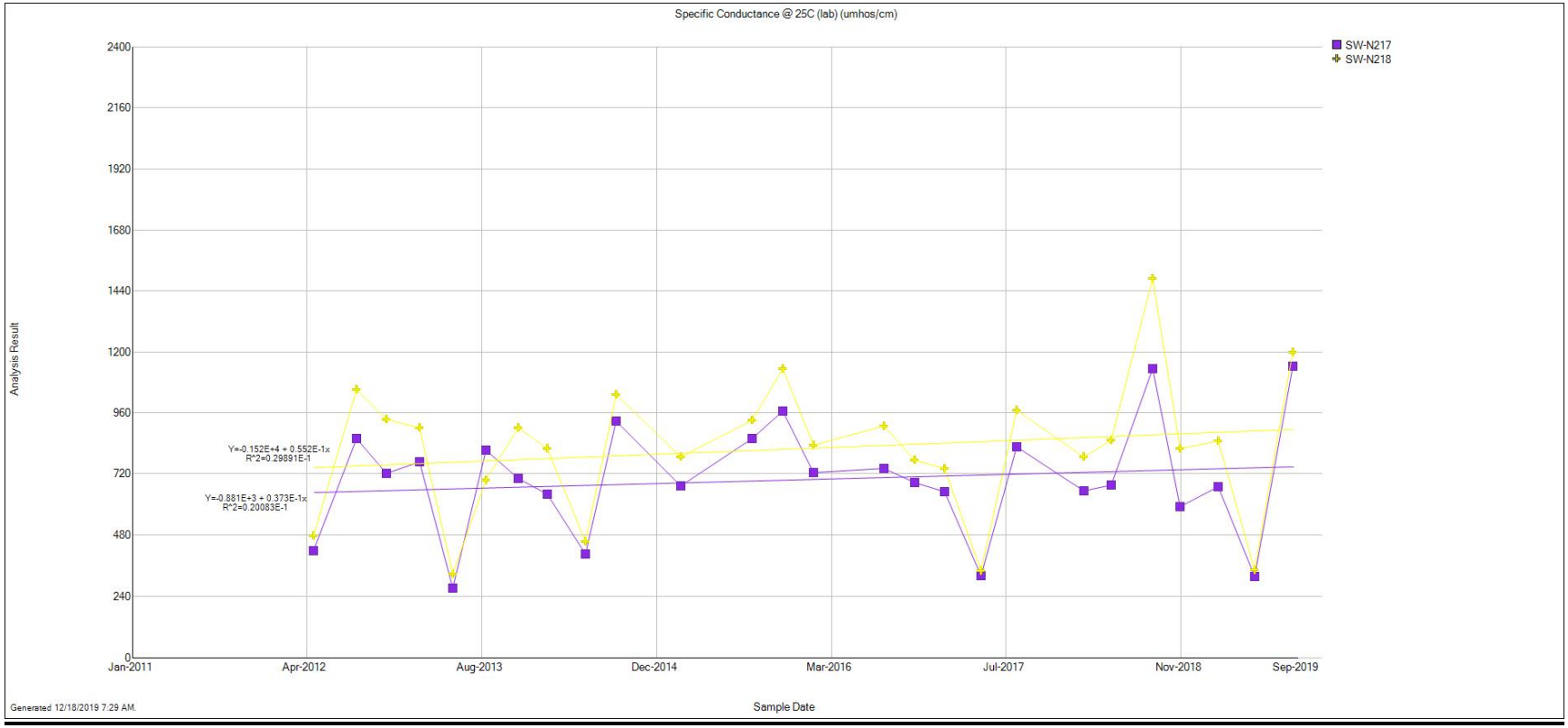

pH (lab) (pH)
SW-N213
SW-N214
Y=0.790E+1 + 0.120E-4x
R^2=0.69008E-2
Y=0.873E+1 -0.718E-5x
R^2=0.10144E-1
8.964
7.968
6.972
5.976
4.98
3.984
2.988
1.992
0.996
0
Analysis Result
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:26 AM.

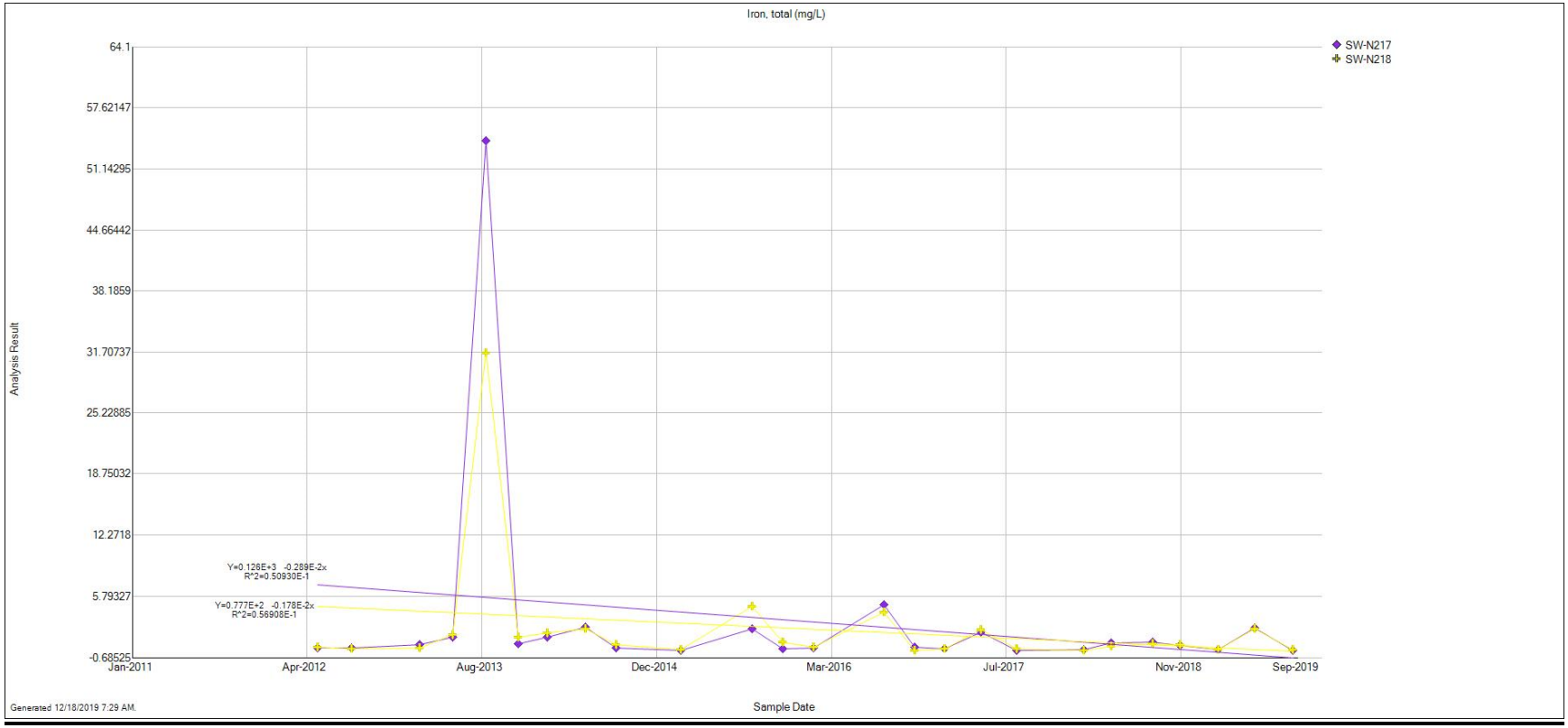

Sodium, dissolved (mg/L)
SW-N213
SW-N214
52.7
47.43
42.16
36.89
31.62
26.35
21.08
15.81
10.54
5.27
0
Analysis Result
Y=-0.441E+2 + 0.155E-2x
R^2=0.31983E-1
Y=-0.471E+2 + 0.162E-2x
R^2=0.35009E-1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:26 AM.

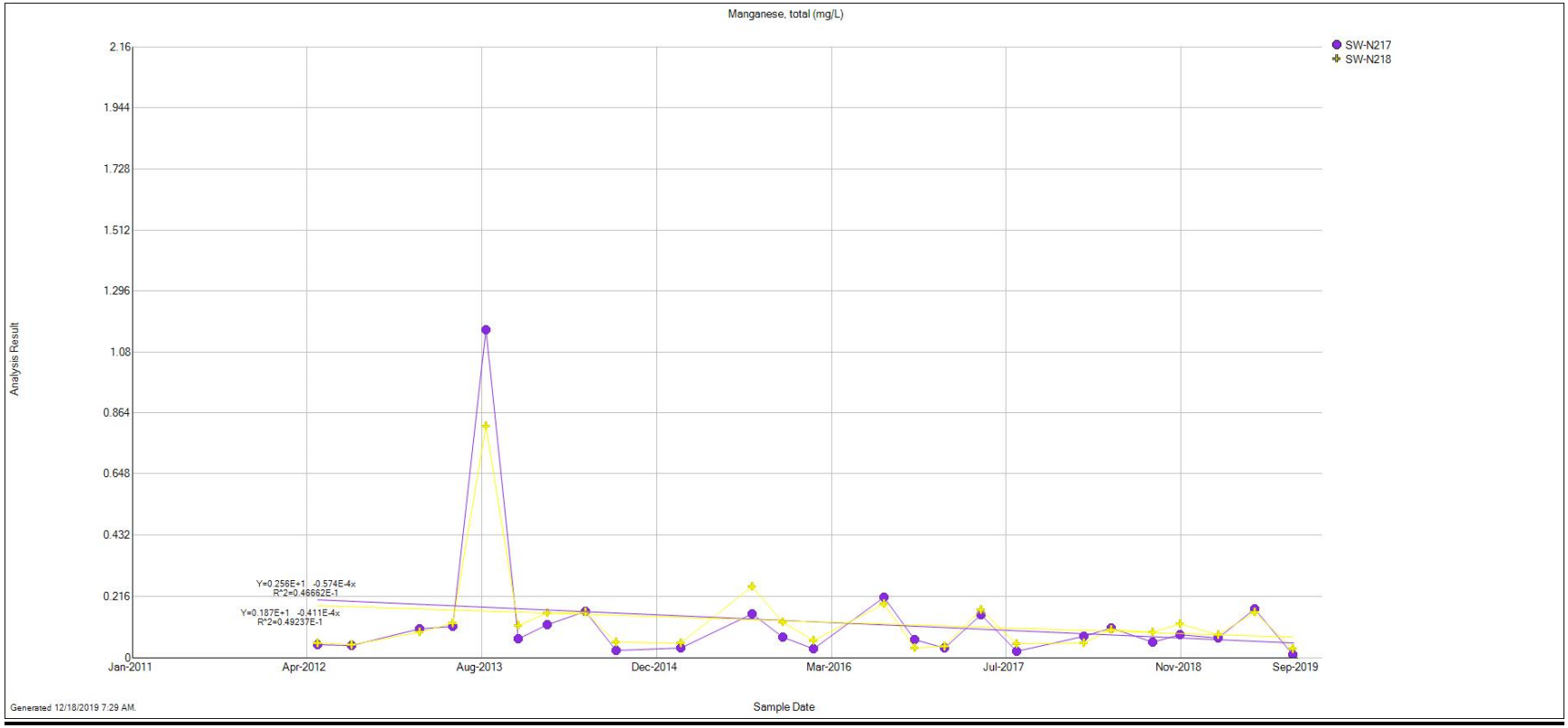

Sulfate, dissolved (mg/L)
SW-N213
SW-N214
Analysis Result
570
513
456
399
342
285
228
171
114
57
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Y=0.184E+3 + 0.132E-2x
R^2=0.15597E-3
Y=0.387E+2 + 0.472E-2x
R^2=0.22051E-2
Generated 12/18/2019 9:26 AM.
Sample Date

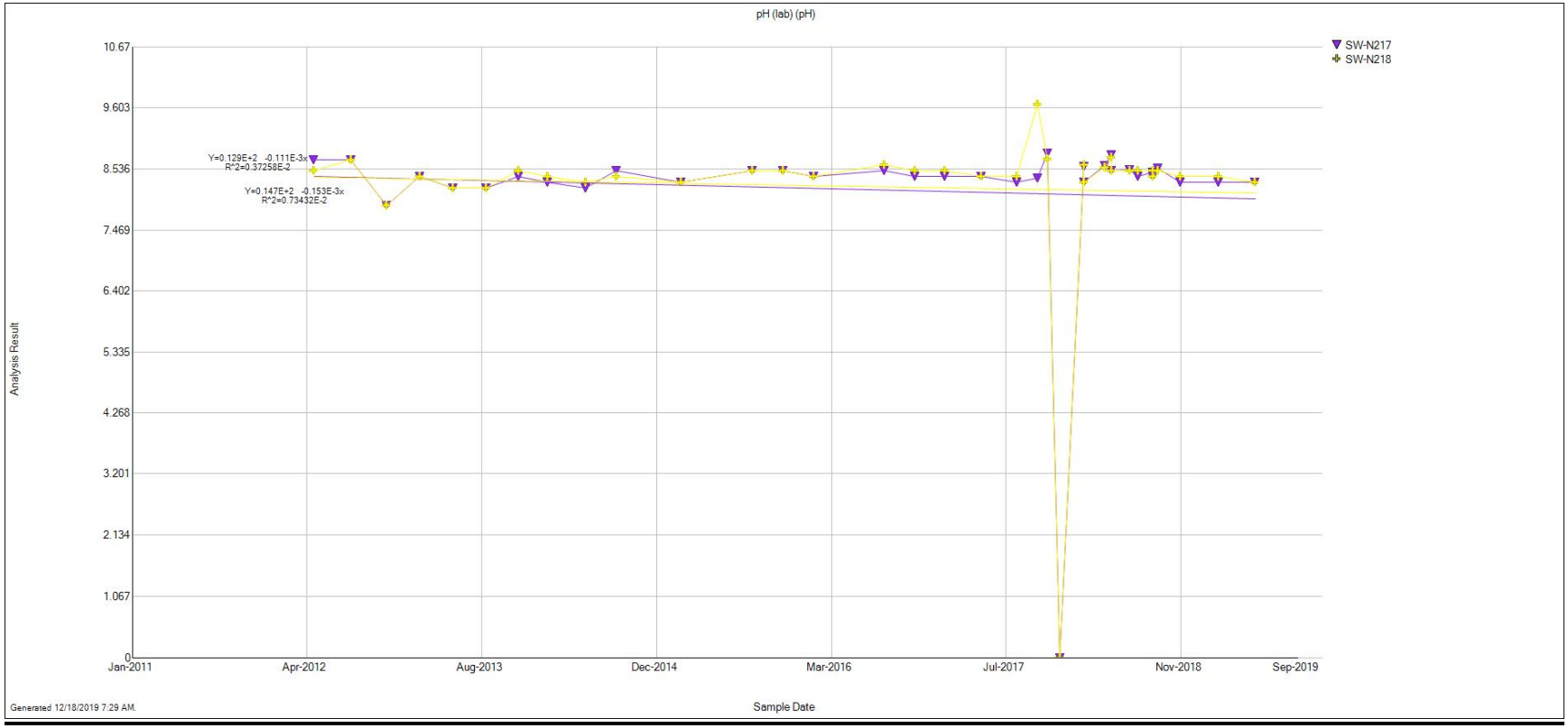

Total Dissolved Solids (mg/L)
SW-N213
SW-N214
Analysis Result
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Y=0.899E+2 + 0.134E-1x
R^2=0.46800E-2
Y=0.118E+3 + 0.127E-1x
R^2=0.40850E-2
Generated 12/18/2019 9:26 AM.
Sample Date

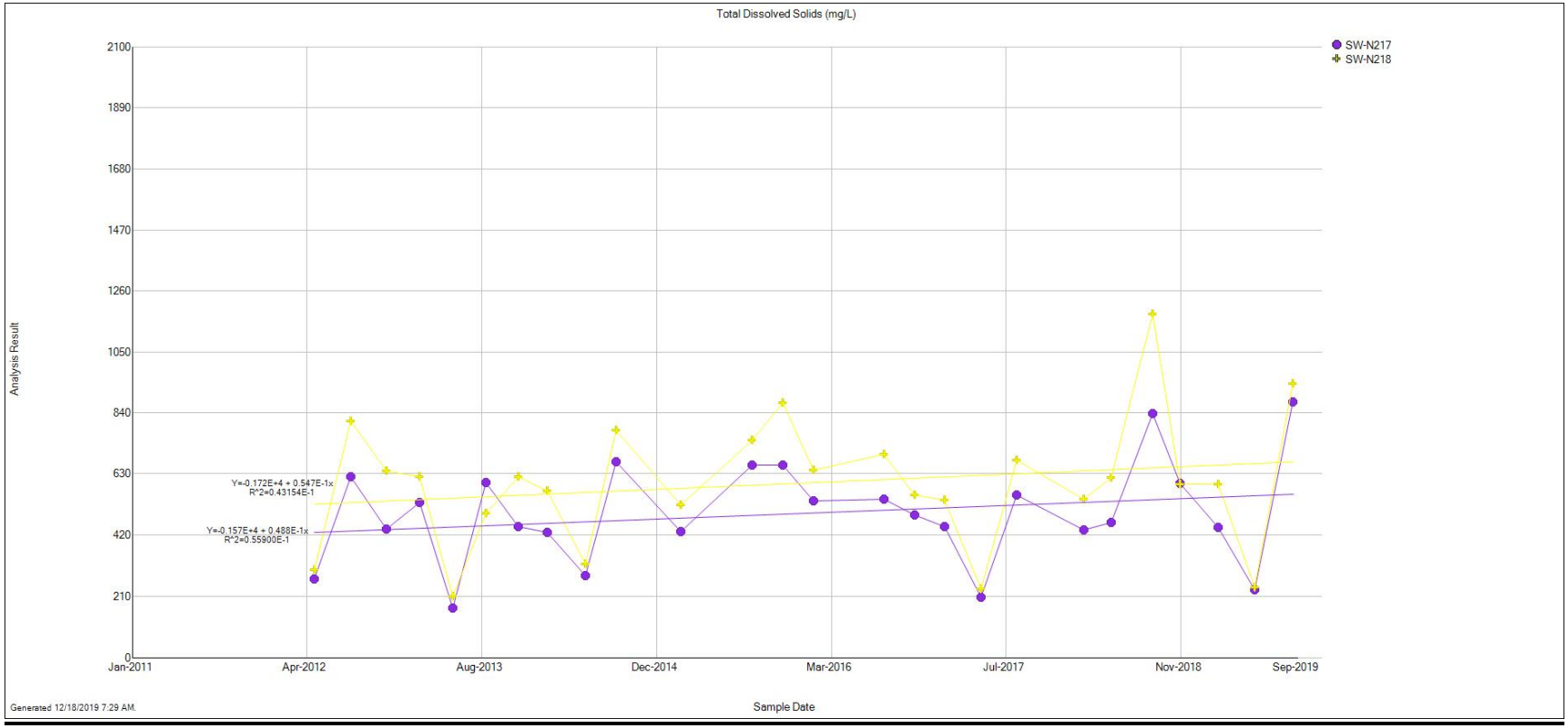

Acidity as CaCO3 (mg/L)
SW-N217
SW-N218
Analysis Result
22
19.8
17.6
15.4
13.2
11
8.8
6.6
4.4
2.2
0
Y=-0.211E+1 + 0.289E-3x
R^2=0.20458E+0
Y=-0.211E+1 + 0.289E-3x
R^2=0.20458E+0
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 7:29 AM.
Sample Date

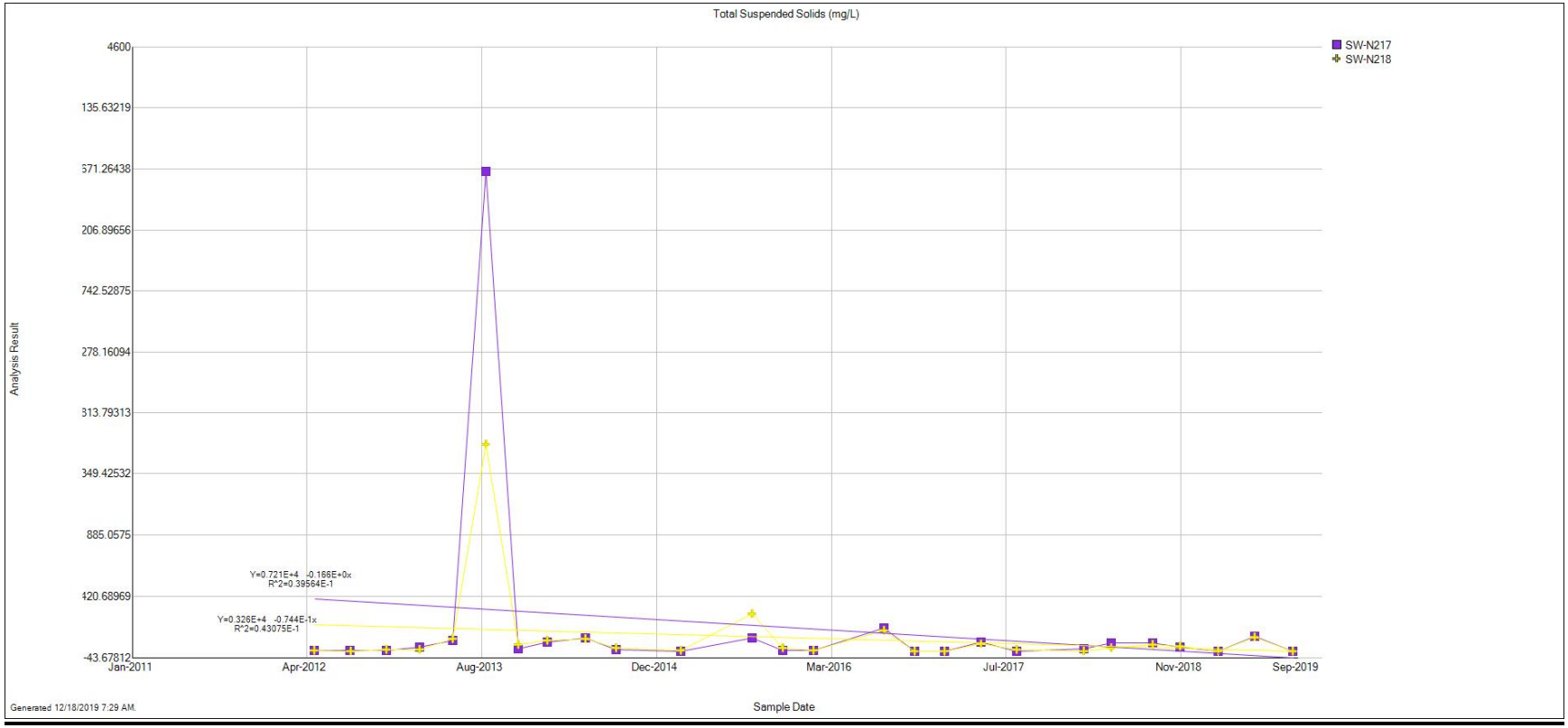

Specific Conductance @ 25C (lab) (umhos/cm)
SW-N217
SW-N218
Analysis Result
2400
2160
1920
1680
1440
1200
960
720
480
240
0
Y=-0.152E+4 + 0.552E-1x
R^2=0.29891E-1
Y=-0.881E+3 + 0.373E-1x
R^2=0.20083E-1
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 7:29 AM.
Sample Date


Iron, total (mg/L)
SW-N217
SW-N218
64.1
57.62147
51.14295
44.66442
38.1859
31.70737
25.22885
18.75032
12.2718
5.79327
-0.68525
Analysis Result
Y=0.126E+3 -0.289E-2x
R^2=0.50930E-1
Y=0.777E+2 -0.178E-2x
R^2=0.56908E-1
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Sample Date
Generated 12/18/2019 7:29 AM.


Manganese, total (mg/L)
SW-N217
SW-N218
Analysis Result
2.16
1.944
1.728
1.512
1.296
1.08
0.864
0.648
0.432
0.216
0
Y=0.256E+1 -0.574E-4x
R^2=0.46662E-1
Y=0.187E+1 -0.411E-4x
R^2=0.49237E-1
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 7:29 AM.
Sample Date


pH (lab) (pH)
SW-N217
SW-N218
Y=0.129E+2 -0.111E-3x
R^2=0.37258E-2
Y=0.147E+2 -0.153E-3x
R^2=0.73432E-2
10.67
9.603
8.536
7.469
6.402
5.335
4.268
3.201
2.134
1.067
0
Analysis Result
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Sample Date
Generated 12/18/2019 7:29 AM.


Total Dissolved Solids (mg/L)
SW-N217
SW-N218
Analysis Result
2100
1890
1680
1470
1260
1050
840
630
420
210
0
Y=-0.172E+4 + 0.547E-1x
R^2=0.43154E-1
Y=-0.157E+4 + 0.488E-1x
R^2=0.55900E-1
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 7:29 AM.
Sample Date


Total Suspended Solids (mg/L)
SW-N217
SW-N218
4600
135.63219
371.26438
206.89656
742.52875
278.16094
313.79313
349.42532
885.0575
420.68969
-43.67812
Analysis Result
Y=0.721E+4 -0.166E+0x
R^2=0.39564E-1
Y=0.326E+4 -0.744E-1x
R^2=0.43075E-1
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 7:29 AM.
Sample Date

Appendix 3
Groundwater Monitoring Data

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Well: GW-N50

	10/31/2018	11/13/2018	12/19/2018	1/15/2019	2/28/2019	3/25/2019	4/16/2019	5/15/2019	6/26/2019	7/19/2019	9/23/2019
Ag, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Al, tot rec, ug/L		970.				490.		90.0			<0.0
Alkalinity, lab, mg/L		669.				578.		426.			324.
As, diss, mg/L		<0.0				<0.0		<0.0			0.000200
Ca, diss, mg/L		375.				325.		270.			223.
Cation-Anion Bal, %		5.900				-6.300		5.700			0.000
Cd, diss, mg/L		0.000100				0.000100		0.000310			0.000220
Cl, diss, mg/L		59.2				57.7		13.2			15.1
CO3, mg/L		<0.0				<0.0		<0.0			<0.0
Fe, diss, mg/L		0.202				1.31		0.101			0.0290
Fe, tot rec, ug/L		9180.				11500.		2540.			2170.
GW Depth (TOC), ft	8.670	11.410	15.150	19.980	22.080	15.110	14.700	7.370	4.780	4.240	4.890
GW Elv, ft	5745.230	5742.490	5738.750	5733.920	5731.820	5739.790	5739.200	5746.530	5749.120	5749.660	5749.010
Hardness, mg/L		1860.				1560.		1200.			947.
HCO3, mg/L		669.				578.		426.			324.
Hg, diss, mg/L		<0.0				<0.0		<0.0			<0.0
K, diss, mg/L		27.1				22.7		18.3			15.3
Mg, diss, mg/L		224.				182.		127.			94.8
Mn, diss, mg/L		0.470				0.940		1.36			1.47
Mn, tot rec, ug/L		500.				490.		1240.			1490.
Mo, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Na, diss, mg/L		152.				119.		77.2			56.7
NH3 as N, diss, mg/L		1.46				1.75		1.42			1.93
NO2 + NO3, diss, mg/L		<0.0				<0.0		0.520			0.390
NO2, diss, mg/L		<0.0				0.0100		<0.0			0.0100
NO3, diss, mg/L		<0.0				<0.0		0.520			0.380
OH, mg/L		<0.0				<0.0		<0.0			<0.0
Pb, diss, mg/L		<0.0				<0.0		<0.0			<0.0
pH (field), pH	7.010	6.790	6.440	6.580	6.590	6.710	6.490	6.690	6.460	6.360	6.400
pH (lab), pH		7.900				7.700		7.600			7.600
PO4, tot, mg/L						0.0600		0.0300			<0.0
PO4, total soluble, mg/L		0.0600									0.810
SAR, ratio		1.600				1.300		0.980			<0.0
Se, diss, mg/L		<0.0				0.000200		<0.0			704.
SO4, diss, mg/L		1200.				1370.		745.			1681
Spec. Cond. (field), umhos/cm	621	3390	1822	1796	1807	3030	1776	2132	1808	1864	1710.000
Spec. Cond. (lab), umhos/cm		3050.000				2750.000		2170.000			<0.000
SS, mL/L/hr		<0.000				<0.000		<0.000			<0.0
Sulfide, tot, mg/L		<0.0				<0.0		<0.0			22.000
Sum Anions, meq/L		40.000				42.000		25.000			22.000
Sum Cations, meq/L		45.000				37.000		28.000			1310.
TDS (calculated), mg/L		2450.				2430.		1520.			1.060
TDS (ratio-measured/calc), rat		1.090				0.970		1.240			1390.
TDS, mg/L		2660.				2360.		1890.			13.600
Temp (Celcius), degrees C	16.600	12.700	13.900	13.500	13.200	13.800	12.000	15.000	15.700	16.400	0.0300
Zn, diss, mg/L		<0.0				<0.0		<0.0			

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Well: GW-N51

	10/31/2018	11/13/2018	12/19/2018	1/15/2019	2/28/2019	3/25/2019	4/16/2019	5/15/2019	6/26/2019	7/19/2019	9/23/2019
Ag, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Al, tot rec, ug/L		18300.				830.		590.			400.
Alkalinity, lab, mg/L		8.70				63.7		15.9			15.3
As, diss, mg/L		0.000400				0.00220		0.000700			0.000300
Ca, diss, mg/L		89.7				114.		104.			90.5
Cation-Anion Bal, %		0.000				0.000		0.000			0.000
Cd, diss, mg/L		0.000770				0.000410		0.000490			0.000650
Cl, diss, mg/L		8.50				11.3		8.00			7.90
CO3, mg/L		<0.0				<0.0		<0.0			<0.0
Fe, diss, mg/L		0.611				6.60		1.91			1.78
Fe, tot rec, ug/L		27700.				14300.		21200.			6970.
GW Depth (TOC), ft	10.190		16.770	21.380	22.150	14.750	11.230	6.780	5.580	5.270	5.670
GW Elv, ft	5743.910		5737.330	5732.720	5731.950	5739.350	5742.870	5747.320	5748.520	5748.830	5748.430
Hardness, mg/L		416.				520.		481.			415.
HCO3, mg/L		8.70				63.7		15.9			15.3
Hg, diss, mg/L		<0.0				<0.0		<0.0			<0.0
K, diss, mg/L		6.40				7.00		7.30			6.70
Mg, diss, mg/L		46.6				57.1		53.8			46.0
Mn, diss, mg/L		0.643				0.859		0.690			0.680
Mn, tot rec, ug/L		682.				885.		710.			690.
Mo, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Na, diss, mg/L		25.4				31.7		28.3			26.3
NH3 as N, diss, mg/L		3.30				3.41		3.39			3.34
NO2 + NO3, diss, mg/L		<0.0				<0.0		<0.0			<0.0
NO2, diss, mg/L		<0.0				<0.0		0.0100			<0.0
NO3, diss, mg/L		<0.0				<0.0		<0.0			<0.0
OH, mg/L		<0.0				<0.0		<0.0			<0.0
Pb, diss, mg/L		0.000100				0.000400		0.000200			<0.0
pH (field), pH	5.440		4.950	5.250	5.750	5.700	5.680	5.340	5.330	5.340	5.210
pH (lab), pH		6.200				6.700		6.000			6.000
PO4, tot, mg/L						<0.0		0.0600			<0.0
PO4, total soluble, mg/L		0.0600									0.570
SAR, ratio		0.550				0.610		0.570			<0.0
Se, diss, mg/L		<0.0				0.000100		<0.0			453.
SO4, diss, mg/L		463.				540.		557.			971
Spec. Cond. (field), umhos/cm	998		932	956	926	1178	1102	905	1048	1088	959.000
Spec. Cond. (lab), umhos/cm		966.000				1160.000		1080.000			<0.000
SS, mL/L/hr		0.400				<0.000		<0.000			<0.0
Sulfide, tot, mg/L		<0.0				<0.0		<0.0			10.000
Sum Anions, meq/L		10.000				13.000		12.000			10.000
Sum Cations, meq/L		10.000				13.000		12.000			646.
TDS (calculated), mg/L		650.				811.		775.			1.200
TDS (ratio-measured/calc), rat		1.190				1.130		1.190			772.
TDS, mg/L		772.				914.		922.			17.500
Temp (Celcius), degrees C	16.200		13.700	13.400	13.300	13.600	11.400	14.900	15.100	15.700	0.490
Zn, diss, mg/L		0.500				0.370		0.480			

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Well: GW-N52

	10/31/2018	11/14/2018	12/19/2018	1/15/2019	2/28/2019	3/25/2019	4/16/2019	6/19/2019	7/17/2019	9/23/2019	9/23/2019
Ag, diss, mg/L		<0.0				<0.0		<0.0		<0.0	<0.0
Al, tot rec, ug/L		40.0				80.0		<0.0		<0.0	400.
Alkalinity, lab, mg/L		229.				228.		213.		205.	15.3
As, diss, mg/L		<0.0				<0.0		<0.0		<0.0	0.000300
Ca, diss, mg/L		146.				139.		165.		130.	90.5
Cation-Anion Bal, %		-1.100				0.000		1.000		-1.200	0.000
Cd, diss, mg/L		0.000110				0.0000800		0.000100		0.0000500	0.000650
Cl, diss, mg/L		5.40				8.00		4.30			7.90
CO3, mg/L		<0.0				<0.0		<0.0		<0.0	<0.0
Fe, diss, mg/L		0.0170				<0.0		<0.0		0.0240	1.78
Fe, tot rec, ug/L		18.0				49.0		9.00		123.	6970.
GW Depth (TOC), ft	14.570	17.560	21.750	23.870	23.710	17.400	14.670	6.130	7.880	5.750	5.670
GW Elv, ft	5740.030	5737.040	5732.850	5730.730	5730.890	5737.200	5739.930	5748.470	5746.720	5748.850	5748.430
Hardness, mg/L		438.				450.		487.		383.	415.
HCO3, mg/L		229.				228.		213.		205.	15.3
Hg, diss, mg/L		<0.0				<0.0		<0.0		<0.0	<0.0
K, diss, mg/L		0.800				0.900		0.700		0.600	6.70
Mg, diss, mg/L		17.8				24.9		18.1		14.1	46.0
Mn, diss, mg/L		0.0310				<0.0		<0.0		0.0100	0.680
Mn, tot rec, ug/L		32.0				<0.0		<0.0		20.0	690.
Mo, diss, mg/L		<0.0				<0.0		<0.0		<0.0	<0.0
Na, diss, mg/L		8.60				10.5		7.20		6.60	26.3
NH3 as N, diss, mg/L		<0.0				<0.0		<0.0		<0.0	3.34
NO2 + NO3, diss, mg/L		<0.0				0.350		0.170		<0.0	<0.0
NO2, diss, mg/L		<0.0				<0.0		<0.0		<0.0	<0.0
NO3, diss, mg/L		<0.0				0.350		0.170		<0.0	<0.0
OH, mg/L		<0.0				<0.0		<0.0		<0.0	<0.0
Pb, diss, mg/L		<0.0				<0.0		<0.0		<0.0	<0.0
pH (field), pH	6.670	6.620	6.530	6.720	6.530	6.700	6.800	6.670	6.700	6.700	5.210
pH (lab), pH		7.600				7.900		8.000		7.600	6.000
PO4, tot, mg/L						<0.0		0.0300		<0.0	<0.0
PO4, total soluble, mg/L		<0.0									0.570
SAR, ratio		0.180				0.220		0.140		0.150	<0.0
Se, diss, mg/L		0.000100				0.00170		0.00120		0.000100	453.
SO4, diss, mg/L		220.				222.		257.		193.	971
Spec. Cond. (field), umhos/cm	822	848	1093	1337	1233	882	882	946	854	759	959.000
Spec. Cond. (lab), umhos/cm		840.000				861.000		880.000		728.000	<0.000
SS, mL/L/hr		<0.000				<0.000		<0.000		<0.000	<0.0
Sulfide, tot, mg/L		<0.0				<0.0		<0.0		<0.0	10.000
Sum Anions, meq/L		9.400				9.500		9.800		8.200	10.000
Sum Cations, meq/L		9.200				9.500		10.000		8.000	646.
TDS (calculated), mg/L		538.				546.		583.		473.	1.200
TDS (ratio-measured/calc), rat		1.120				1.150		1.080		1.120	772.
TDS, mg/L		602.				628.		632.		528.	17.500
Temp (Celcius), degrees C	15.000	13.700	13.300	12.900	13.300	13.300	12.700	13.500	14.400	16.700	0.490
Zn, diss, mg/L		<0.0				<0.0		<0.0		<0.0	

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Well: GW-N53

	10/31/2018	11/14/2018	12/19/2018	1/15/2019	2/28/2019	3/26/2019	4/16/2019	5/15/2019	6/26/2019	7/19/2019	9/16/2019
Ag, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Al, tot rec, ug/L		<0.0				<0.0		<0.0			<0.0
Alkalinity, lab, mg/L		567.				552.		550.			528.
As, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Ca, diss, mg/L		318.				311.		334.			335.
Cation-Anion Bal, %		0.000				-4.200		-1.000			2.100
Cd, diss, mg/L		0.000100				<0.0		0.000100			0.000100
Cl, diss, mg/L		68.3				67.0		66.1			69.0
CO3, mg/L		<0.0				<0.0		<0.0			<0.0
Fe, diss, mg/L		0.255				0.240		0.260			0.0400
Fe, tot rec, ug/L		1530.				1140.		1420.			320.
GW Depth (TOC), ft	83.220	83.370	83.100	83.220	82.990	83.750	84.790	83.720	83.230	83.270	82.610
GW Elv, ft	5638.880	5638.730	5639.000	5638.880	5639.110	5638.350	5637.310	5638.380	5638.870	5638.830	5639.490
Hardness, mg/L		1860.				1830.		1940.			1940.
HCO3, mg/L		567.				552.		550.			528.
Hg, diss, mg/L		<0.0				<0.0		<0.0			<0.0
K, diss, mg/L		33.9				33.3		34.9			35.4
Mg, diss, mg/L		260.				256.		269.			267.
Mn, diss, mg/L		0.0600				0.0700		0.0700			0.0600
Mn, tot rec, ug/L		70.0				70.0		80.0			60.0
Mo, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Na, diss, mg/L		194.				187.		181.			189.
NH3 as N, diss, mg/L		2.48				2.61		2.94			2.35
NO2 + NO3, diss, mg/L		0.200				0.100		<0.0			0.860
NO2, diss, mg/L		<0.0				<0.0		<0.0			0.530
NO3, diss, mg/L		0.200				0.100		<0.0			0.330
OH, mg/L		<0.0				<0.0		<0.0			<0.0
Pb, diss, mg/L		<0.0				<0.0		<0.0			<0.0
pH (field), pH	7.080	7.020	7.110	7.250	7.130	6.870	7.050	6.910	6.910	6.940	7.400
pH (lab), pH		8.000				7.900		7.800			7.900
PO4, tot, mg/L						0.0600		0.0900			<0.0
PO4, total soluble, mg/L		<0.0									1.900
SAR, ratio		2.000				1.900		1.800			<0.0
Se, diss, mg/L		<0.0				0.000200		<0.0			1610.
SO4, diss, mg/L		1600.				1740.		1710.			3540
Spec. Cond. (field), umhos/cm	3760	3770	3800	3880	3750	3640	4020	389	3	4	3460.000
Spec. Cond. (lab), umhos/cm		3530.000				3500.000		3350.000			<0.000
SS, mL/L/hr		<0.000				<0.000		<0.000			<0.0
Sulfide, tot, mg/L		<0.0				<0.0		<0.0			46.000
Sum Anions, meq/L		47.000				50.000		49.000			48.000
Sum Cations, meq/L		47.000				46.000		48.000			2830.
TDS (calculated), mg/L		2820.				2930.		2930.			1.120
TDS (ratio-measured/calc), rat		1.110				1.070		1.110			3160.
TDS, mg/L		3130.				3140.		3250.			14.500
Temp (Celcius), degrees C	12.600	12.800	12.700	12.300	12.400	12.600	12.600	15.200	14.600	13.700	<0.0
Zn, diss, mg/L		<0.0				<0.0		<0.0			

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Well: GW-N54

	10/31/2018	11/14/2018	12/19/2018	1/15/2019	2/28/2019	3/27/2019	4/16/2019	5/15/2019	6/26/2019	7/19/2019	9/23/2019
Ag, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Al, tot rec, ug/L		<0.0				<0.0		<0.0			130.
Alkalinity, lab, mg/L		577.				528.		534.			507.
As, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Ca, diss, mg/L		438.				464.		445.			455.
Cation-Anion Bal, %		-3.400				2.800		0.700			2.200
Cd, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Cl, diss, mg/L		119.				99.2		115.			72.9
CO3, mg/L		<0.0				<0.0		<0.0			<0.0
Fe, diss, mg/L		0.410				0.0800		0.140			<0.0
Fe, tot rec, ug/L		1610.				1350.		770.			880.
GW Depth (TOC), ft	64.480	65.200	66.260	66.930	67.430	66.880	67.800	65.250	63.850	63.680	63.580
GW Elv, ft	5657.420	5656.700	5655.640	5654.970	5654.470	5655.020	5654.100	5656.650	5658.050	5658.220	5658.320
Hardness, mg/L		3120.				3250.		3140.			3110.
HCO3, mg/L		577.				528.		534.			507.
Hg, diss, mg/L		<0.0				<0.0		<0.0			<0.0
K, diss, mg/L		26.0				28.0		27.0			26.0
Mg, diss, mg/L		491.				507.		492.			479.
Mn, diss, mg/L		0.210				0.260		0.260			0.240
Mn, tot rec, ug/L		220.				230.		290.			280.
Mo, diss, mg/L		<0.0				<0.0		<0.0			<0.0
Na, diss, mg/L		180.				177.		178.			171.
NH3 as N, diss, mg/L		2.67				3.01		1.62			2.45
NO2 + NO3, diss, mg/L		<0.0				0.0600		1.14			0.280
NO2, diss, mg/L		<0.0				<0.0		<0.0			0.0300
NO3, diss, mg/L		<0.0				0.0600		1.14			0.250
OH, mg/L		<0.0				<0.0		<0.0			<0.0
Pb, diss, mg/L		<0.0				<0.0		<0.0			<0.0
pH (field), pH	6.910	6.970	6.900	6.970	6.930	6.940	7.090	6.830	6.960	7.000	6.910
pH (lab), pH		8.000				8.000		7.800			7.700
PO4, tot, mg/L						<0.0		<0.0			<0.0
PO4, total soluble, mg/L		<0.0									1.400
SAR, ratio		1.400				1.400		1.400			<0.0
Se, diss, mg/L		<0.0				<0.0		<0.0			2630.
SO4, diss, mg/L		2910.				2700.		2670.			4780
Spec. Cond. (field), umhos/cm	5150	4990	5090	5200	4980	5270	2630	1835	3	4	4800.000
Spec. Cond. (lab), umhos/cm		4770.000				4720.000		4440.000			<0.000
SS, mL/L/hr		<0.000				<0.000		<0.000			<0.0
Sulfide, tot, mg/L		<0.0				<0.0		<0.0			67.000
Sum Anions, meq/L		76.000				70.000		70.000			70.000
Sum Cations, meq/L		71.000				74.000		71.000			4150.
TDS (calculated), mg/L		4520.				4300.		4260.			1.160
TDS (ratio-measured/calc), rat		1.020				1.100		1.110			4830.
TDS, mg/L		4620.				4750.		4710.			13.100
Temp (Celcius), degrees C	12.800	12.600	12.600	12.400	12.600	13.400	13.000	14.600	14.200	13.900	<0.0
Zn, diss, mg/L		<0.0				<0.0		<0.0			

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Well: GW-N55

	10/31/2018	11/14/2018	12/19/2018	1/15/2019	2/28/2019	3/27/2019	4/16/2019	5/15/2019	6/19/2019	7/19/2019	9/23/2019
Ag, diss, mg/L									<0.0		<0.0
Al, tot rec, ug/L									1500.		1900.
Alkalinity, lab, mg/L									649.		688.
As, diss, mg/L									<0.0		<0.0
Ca, diss, mg/L									442.		429.
Cation-Anion Bal, %									3.700		-4.800
Cd, diss, mg/L									<0.0		<0.0
Cl, diss, mg/L									141.		136.
CO3, mg/L									<0.0		<0.0
Fe, diss, mg/L									<0.0		<0.0
Fe, tot rec, ug/L									1010.		1250.
GW Depth (TOC), ft	64.040	63.850	63.200	62.850	62.380	61.430	64.440	62.950	63.520	63.600	62.880
GW Elv, ft	5657.460	5657.650	5658.300	5658.650	5659.120	5660.070	5657.060	5658.550	5657.980	5657.900	5658.620
Hardness, mg/L									10500.		10300.
HCO3, mg/L									649.		688.
Hg, diss, mg/L									<0.0		<0.0
K, diss, mg/L									35.0		33.0
Mg, diss, mg/L									2290.		2230.
Mn, diss, mg/L									0.200		0.200
Mn, tot rec, ug/L									200.		300.
Mo, diss, mg/L									<0.0		<0.0
Na, diss, mg/L									334.		324.
NH3 as N, diss, mg/L									0.900		0.920
NO2 + NO3, diss, mg/L									1.30		0.460
NO2, diss, mg/L									<0.0		<0.0
NO3, diss, mg/L									1.30		0.460
OH, mg/L									<0.0		<0.0
Pb, diss, mg/L									<0.0		<0.0
pH (field), pH	6.730		6.730	6.770	6.690	6.710	6.660	6.660	6.770	6.770	6.740
pH (lab), pH									7.700		7.800
PO4, tot, mg/L									0.120		0.0600
SAR, ratio									1.400		1.400
Se, diss, mg/L									0.00100		<0.0
SO4, diss, mg/L									9200.		10700.
Spec. Cond. (field), umhos/cm	11520		12050	12170	11720	11660	12020	6	11	12	11830
Spec. Cond. (lab), umhos/cm									11200.000		11600.000
SS, mL/L/hr									<0.000		1.600
Sulfide, tot, mg/L									<0.0		<0.0
Sum Anions, meq/L									210.000		242.000
Sum Cations, meq/L									226.000		220.000
TDS (calculated), mg/L									12800.		14300.
TDS (ratio-measured/calc), rat									1.110		1.020
TDS, mg/L									14200.		14600.
Temp (Celcius), degrees C	13.100		12.600	12.200	12.600	13.100	13.300	15.100	14.500	14.500	13.100
Zn, diss, mg/L									<0.0		<0.0

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019
Well: GW-N56

	10/31/2018	11/13/2018	11/14/2018	12/19/2018	1/15/2019	2/28/2019	3/25/2019	4/16/2019	5/15/2019	6/26/2019	7/19/2019	9/16/2019
Ag, diss, mg/L			<0.0				<0.0		<0.0			<0.0
Al, tot rec, ug/L			8180.				79300.		61300.			100.
Alkalinity, lab, mg/L			594.				571.		591.			560.
As, diss, mg/L			<0.0				<0.0		0.00100			<0.0
Ca, diss, mg/L			394.				455.		449.			419.
Cation-Anion Bal, %			1.800				0.000		0.800			0.900
Cd, diss, mg/L			<0.0				<0.0		<0.0			0.000100
Cl, diss, mg/L			58.0				54.6		56.0			59.5
CO3, mg/L			<0.0				<0.0		<0.0			<0.0
Fe, diss, mg/L			0.0270				0.0500		0.0300			0.0500
Fe, tot rec, ug/L			4600.				32000.		24700.			1510.
GW Depth (TOC), ft	76.900	77.400		76.750	76.970	77.340	79.520	79.670	78.350	78.020	78.140	77.680
GW Elv, ft	5637.100	5636.600		5637.250	5637.030	5636.660	5634.480	5634.330	5635.650	5635.980	5635.860	5636.320
Hardness, mg/L			2450.				2850.		2750.			2540.
HCO3, mg/L			594.				571.		591.			560.
Hg, diss, mg/L			<0.0				<0.0		<0.0			<0.0
K, diss, mg/L			32.3				33.0		34.0			34.2
Mg, diss, mg/L			356.				416.		395.			362.
Mn, diss, mg/L			0.210				0.200		0.140			0.330
Mn, tot rec, ug/L			310.				780.		620.			330.
Mo, diss, mg/L			<0.0				<0.0		<0.0			<0.0
Na, diss, mg/L			161.				158.		158.			171.
NH3 as N, diss, mg/L			2.61				2.83		2.68			2.64
NO2 + NO3, diss, mg/L			<0.0				0.0200		<0.0			<0.0
NO2, diss, mg/L			<0.0				0.0100		<0.0			<0.0
NO3, diss, mg/L			<0.0				<0.0		<0.0			<0.0
OH, mg/L			<0.0				<0.0		<0.0			<0.0
Pb, diss, mg/L			<0.0				<0.0		<0.0			<0.0
pH (field), pH	7.010	6.930		6.960	6.920	6.960	6.840	6.850	6.800	6.860	6.720	6.800
pH (lab), pH			7.900				7.900		7.800			7.700
PO4, tot, mg/L							<0.0		<0.0			<0.0
PO4, total soluble, mg/L			<0.0									1.500
SAR, ratio			1.400				1.300		1.300			0.000300
Se, diss, mg/L			<0.0				<0.0		<0.0			2160.
SO4, diss, mg/L			1950.				2460.		2320.		4	3890
Spec. Cond. (field), umhos/cm	4110	330		4320	4250	4170	4720	4890	4	4		3980.000
Spec. Cond. (lab), umhos/cm			4000.000				4440.000		4000.000			<0.000
SS, mL/L/hr			0.200				25.400		20.700			<0.0
Sulfide, tot, mg/L			<0.0				<0.0		0.400			58.000
Sum Anions, meq/L			55.000				65.000		62.000			59.000
Sum Cations, meq/L			57.000				65.000		63.000			3550.
TDS (calculated), mg/L			3320.				3930.		3780.			1.090
TDS (ratio-measured/calc), rat			1.150				1.130		1.170			3860.
TDS, mg/L			3820.				4450.		4430.		14.600	14.900
Temp (Celcius), degrees C	12.600	12.800		13.500	12.000	12.800	13.300	14.100	15.300	14.900		<0.0
Zn, diss, mg/L			<0.0				0.160		<0.0			

New Horizon North Mine

Date Range: 10/01/2018 to 09/30/2019

Well: GW-N57

	10/31/2018	11/14/2018	12/19/2018	1/15/2019	2/28/2019	3/25/2019	4/16/2019	5/15/2019	6/26/2019	7/19/2019	9/9/2019
Ag, diss, mg/L		<0.0				<0.0		<0.0			
Al, tot rec, ug/L		<0.0				200.		<0.0			
Alkalinity, lab, mg/L		600.				610.		606.			
As, diss, mg/L		<0.0				<0.0		<0.0			
Ca, diss, mg/L		516.				512.		528.			
Cation-Anion Bal, %		-1.900				-0.700		1.300			
Cd, diss, mg/L		<0.0				<0.0		<0.0			
Cl, diss, mg/L		30.2				30.6		29.6			
CO3, mg/L		<0.0				<0.0		<0.0			
Fe, diss, mg/L		0.200				0.170		0.120			
Fe, tot rec, ug/L		1670.				1800.		1450.			
GW Depth (TOC), ft	52.060	52.110	52.440	52.790	53.110	53.370	53.320	52.810	51.650	51.270	50.660
GW Elv, ft	5661.840	5661.790	5661.460	5661.110	5660.790	5660.530	5660.580	5661.090	5662.250	5662.630	5663.240
Hardness, mg/L		3430.				3410.		3440.			
HCO3, mg/L		600.				610.		606.			
Hg, diss, mg/L		<0.0				<0.0		<0.0			
K, diss, mg/L		29.0				28.0		29.0			
Mg, diss, mg/L		519.				518.		515.			
Mn, diss, mg/L		0.790				0.770		0.780			
Mn, tot rec, ug/L		820.				780.		810.			
Mo, diss, mg/L		<0.0				<0.0		<0.0			
Na, diss, mg/L		142.				144.		144.			
NH3 as N, diss, mg/L		2.89				3.08		3.07			
NO2 + NO3, diss, mg/L		<0.0				<0.0		<0.0			
NO2, diss, mg/L		<0.0				<0.0		<0.0			
NO3, diss, mg/L		<0.0				<0.0		<0.0			
OH, mg/L		<0.0				<0.0		<0.0			
Pb, diss, mg/L		<0.0				<0.0		<0.0			
pH (field), pH	6.770	6.750	6.750	6.650	6.700	6.690	6.830	6.640	6.620	6.690	6.560
pH (lab), pH		7.700				7.700		7.800			
PO4, tot, mg/L						<0.0		<0.0			
PO4, total soluble, mg/L		<0.0									
SAR, ratio		1.100				1.100		1.100			
Se, diss, mg/L		<0.0				<0.0		<0.0			
SO4, diss, mg/L		3150.				2990.		2900.			
Spec. Cond. (field), umhos/cm	5100	5170	5340	5320	5140	5150	5580	299	5	5	4960
Spec. Cond. (lab), umhos/cm		4880.000				4880.000		4570.000			
SS, mL/L/hr		<0.000				<0.000		<0.000			
Sulfide, tot, mg/L		<0.0				<0.0		<0.0			
Sum Anions, meq/L		79.000				76.000		74.000			
Sum Cations, meq/L		76.000				75.000		76.000			
TDS (calculated), mg/L		4760.				4600.		4520.			
TDS (ratio-measured/calc), rat		1.040				1.100		1.090			
TDS, mg/L		4940.				5040.		4920.			
Temp (Celcius), degrees C	12.600	12.800	12.900	12.400	12.800	132.000	13.300	13.700	14.700	14.100	14.800
Zn, diss, mg/L		<0.0				<0.0		<0.0			

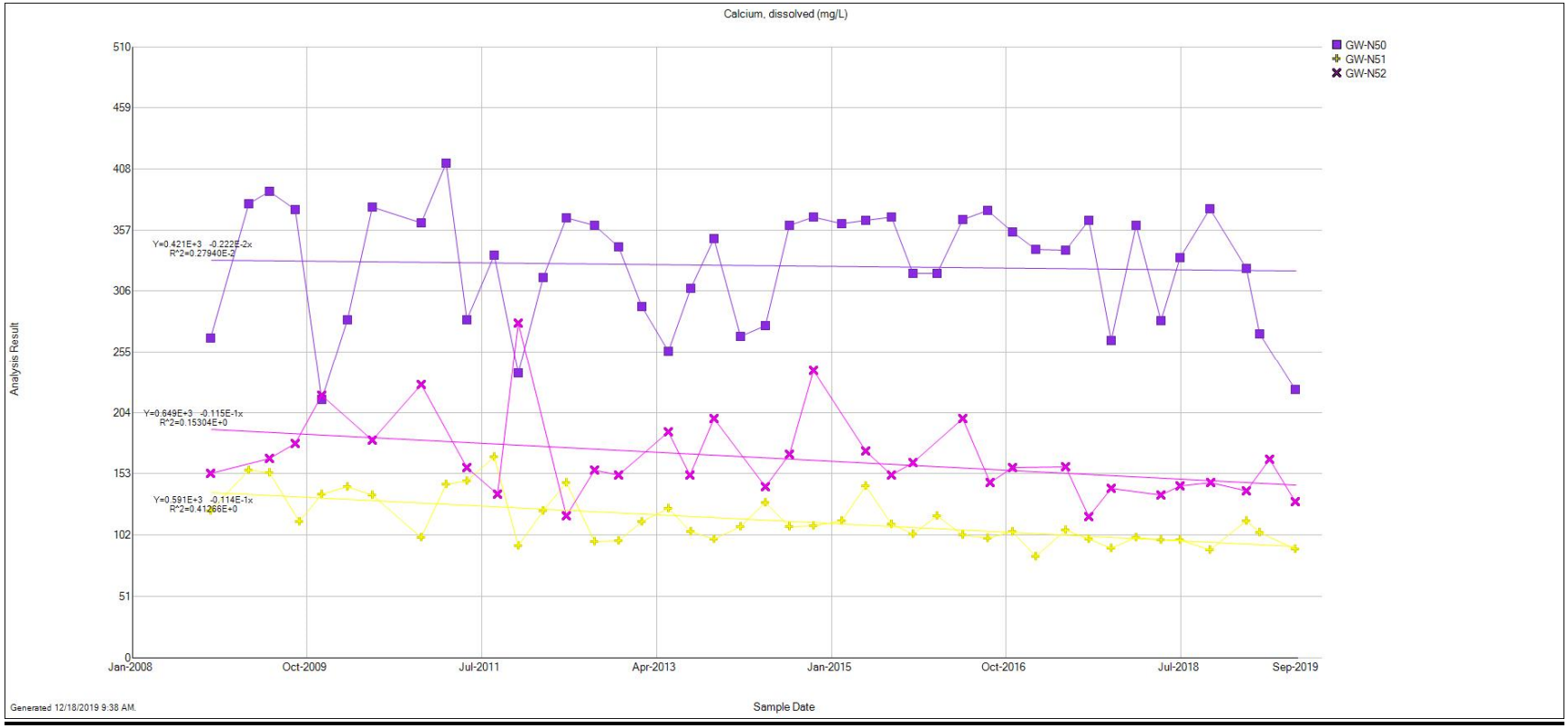
New Horizon North Mine

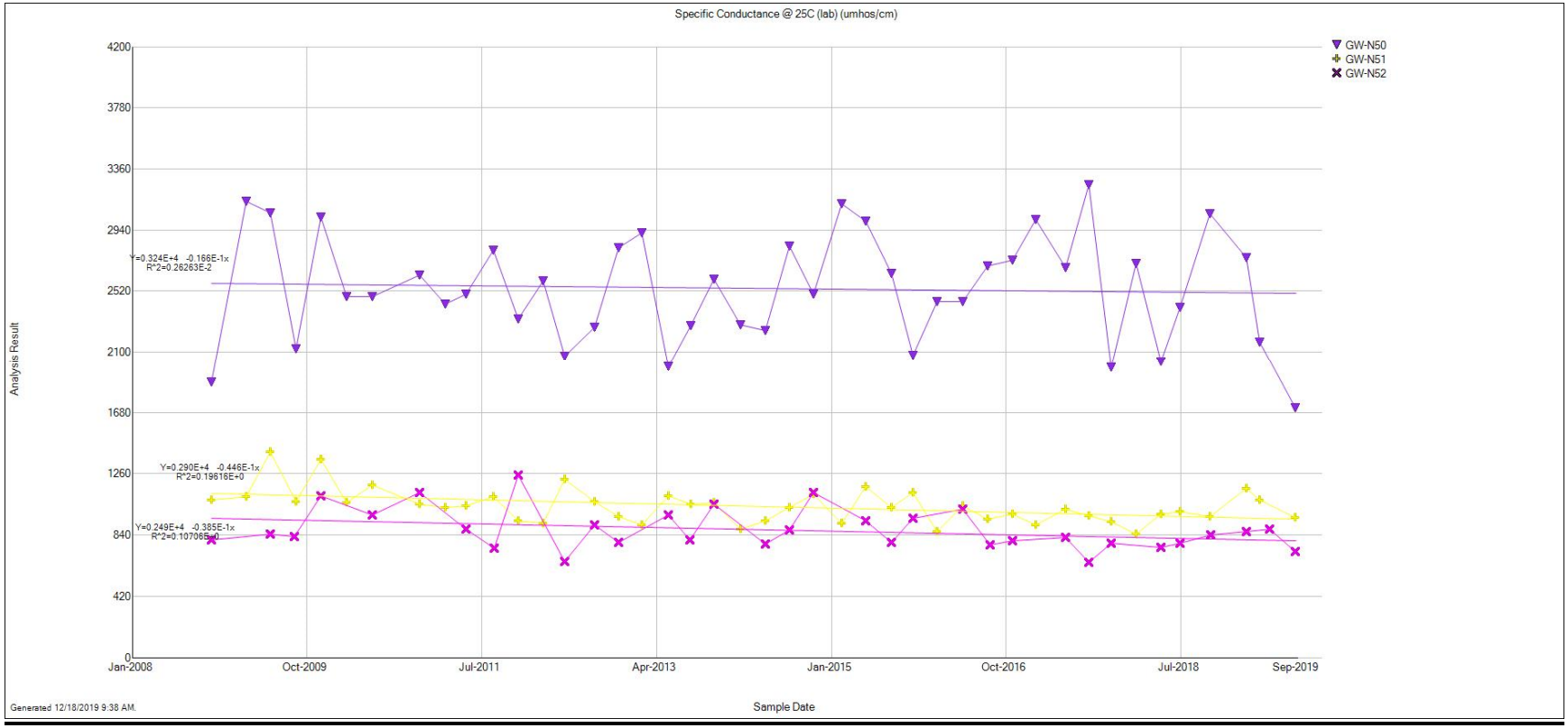
Date Range: 10/01/2018 to 09/30/2019

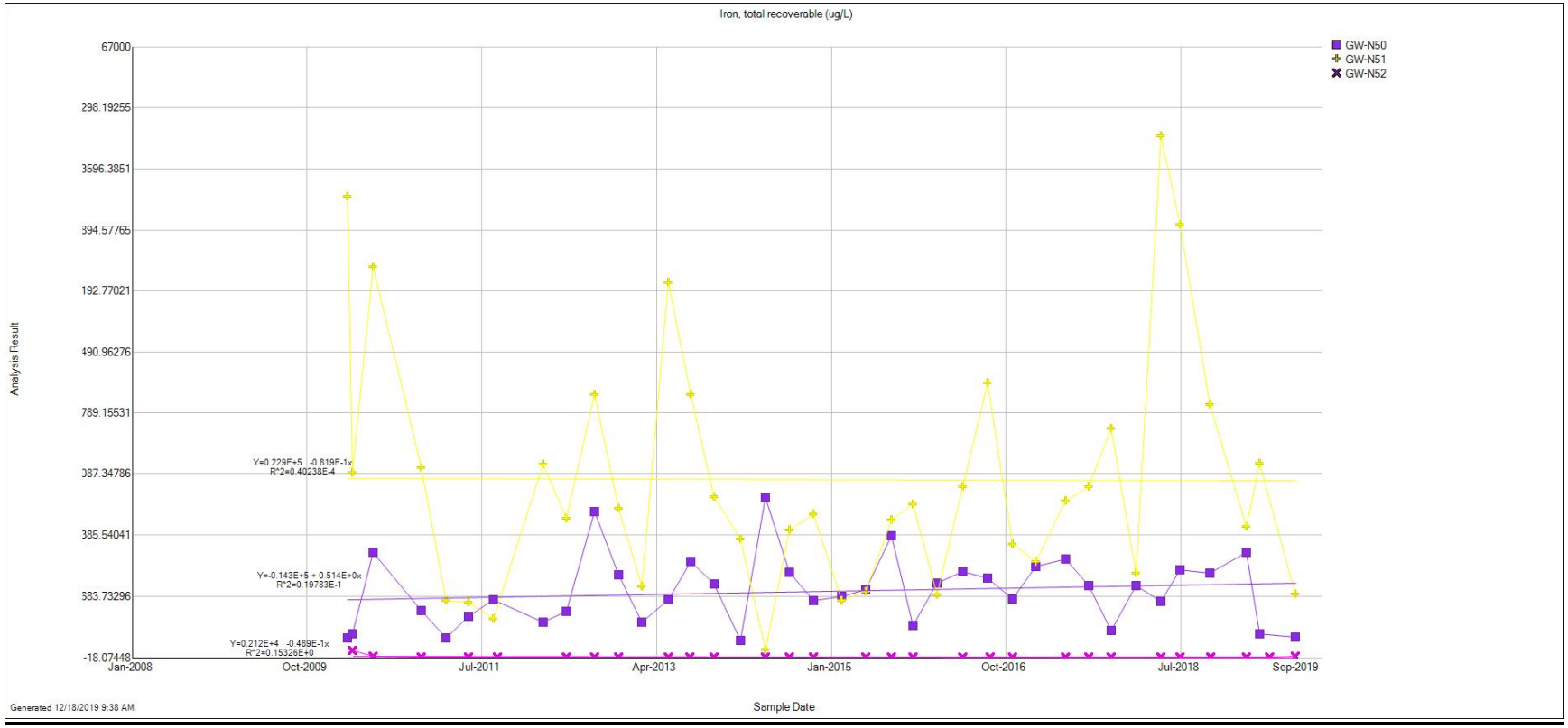
Well: GW-N58

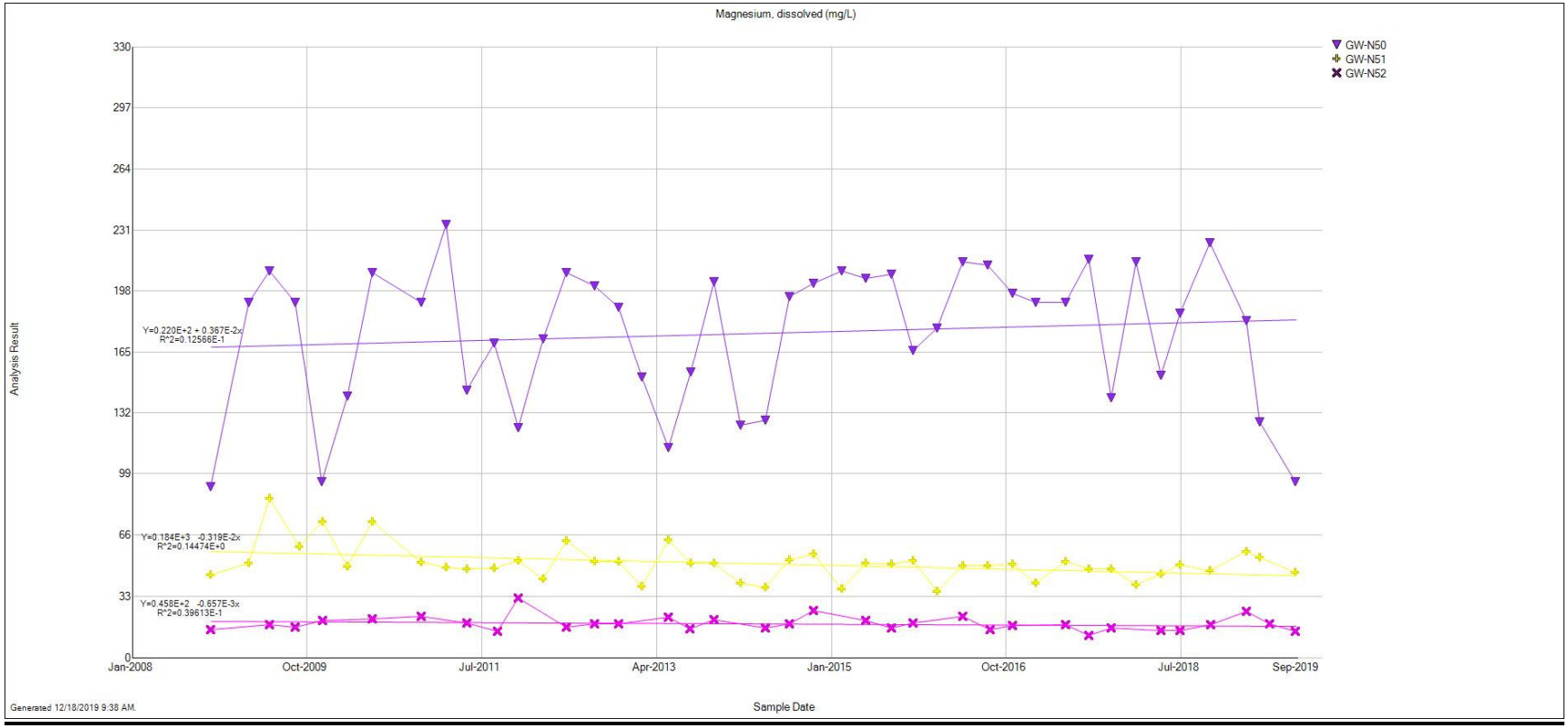
	10/31/2018	11/13/2018	11/14/2018	12/19/2018	1/15/2019	2/28/2019	3/26/2019	4/16/2019	5/15/2019	6/26/2019	7/19/2019	9/9/2019
Ag, diss, mg/L			<0.0				<0.0		<0.0			
Al, tot rec, ug/L			800.				300.		300.			
Alkalinity, lab, mg/L			544.				572.		564.			
As, diss, mg/L			<0.0				<0.0		<0.0			
Ca, diss, mg/L			475.				471.		473.			
Cation-Anion Bal, %			10.100				0.000		0.500			
Cd, diss, mg/L			<0.0				<0.0		<0.0			
Cl, diss, mg/L			117.				45.2		44.5			
CO3, mg/L			<0.0				<0.0		<0.0			
Fe, diss, mg/L			0.120				1.01		1.15			
Fe, tot rec, ug/L			19600.				12600.		12300.			
GW Depth (TOC), ft	52.620	52.730		52.710	53.000	53.450	53.810	53.660	53.360	51.890	51.310	50.130
GW Elv, ft	5661.380	5661.270		5661.290	5661.000	5660.550	5660.190	5660.3	5660.640	5662.110	5662.690	5663.870
Hardness, mg/L			4740.				4090.		4250.			
HCO3, mg/L			544.				572.		564.			
Hg, diss, mg/L			<0.0				<0.0		<0.0			
K, diss, mg/L			24.0				23.0		23.0			
Mg, diss, mg/L			864.				707.		746.			
Mn, diss, mg/L			0.970				0.670		0.830			
Mn, tot rec, ug/L			990.				680.		890.			
Mo, diss, mg/L			<0.0				<0.0		<0.0			
Na, diss, mg/L			185.				180.		175.			
NH3 as N, diss, mg/L			2.05				2.04		1.95			
NO2 + NO3, diss, mg/L			<0.0				<0.0		<0.0			
NO2, diss, mg/L			<0.0				0.0100		<0.0			
NO3, diss, mg/L			<0.0				<0.0		<0.0			
OH, mg/L			<0.0				<0.0		<0.0			
Pb, diss, mg/L			<0.0				<0.0		<0.0			
pH (field), pH	6.800	6.730		6.820	6.730	6.730	6.620	6.810	6.600	6.700	6.790	6.530
pH (lab), pH			7.800				7.700		7.700			
PO4, tot, mg/L							0.0600		<0.0			
PO4, total soluble, mg/L			<0.0									
SAR, ratio			1.200				1.200		1.200			
Se, diss, mg/L			<0.0				<0.0		<0.0			
SO4, diss, mg/L			3380.				3670.		3800.			
Spec. Cond. (field), umhos/cm	5200	6190		5370	5370	5150	5710	5740	1434	5	5	5930
Spec. Cond. (lab), umhos/cm			6220.000				5570.000		5430.000			
SS, mL/L/hr			<0.000				<0.000		<0.000			
Sulfide, tot, mg/L			<0.0				<0.0		<0.0			
Sum Anions, meq/L			85.000				90.000		92.000			
Sum Cations, meq/L			104.000				90.000		93.000			
TDS (calculated), mg/L			5380.				5450.		5610.			
TDS (ratio-measured/calc), rat			1.220				1.080		1.140			
TDS, mg/L			6550.				5910.		6400.			
Temp (Celcius), degrees C	12.800	12.600		12.700	12.400	12.800	12.900	13.000	13.900	14.800	14.100	14.200
Zn, diss, mg/L			<0.0				<0.0		<0.0			

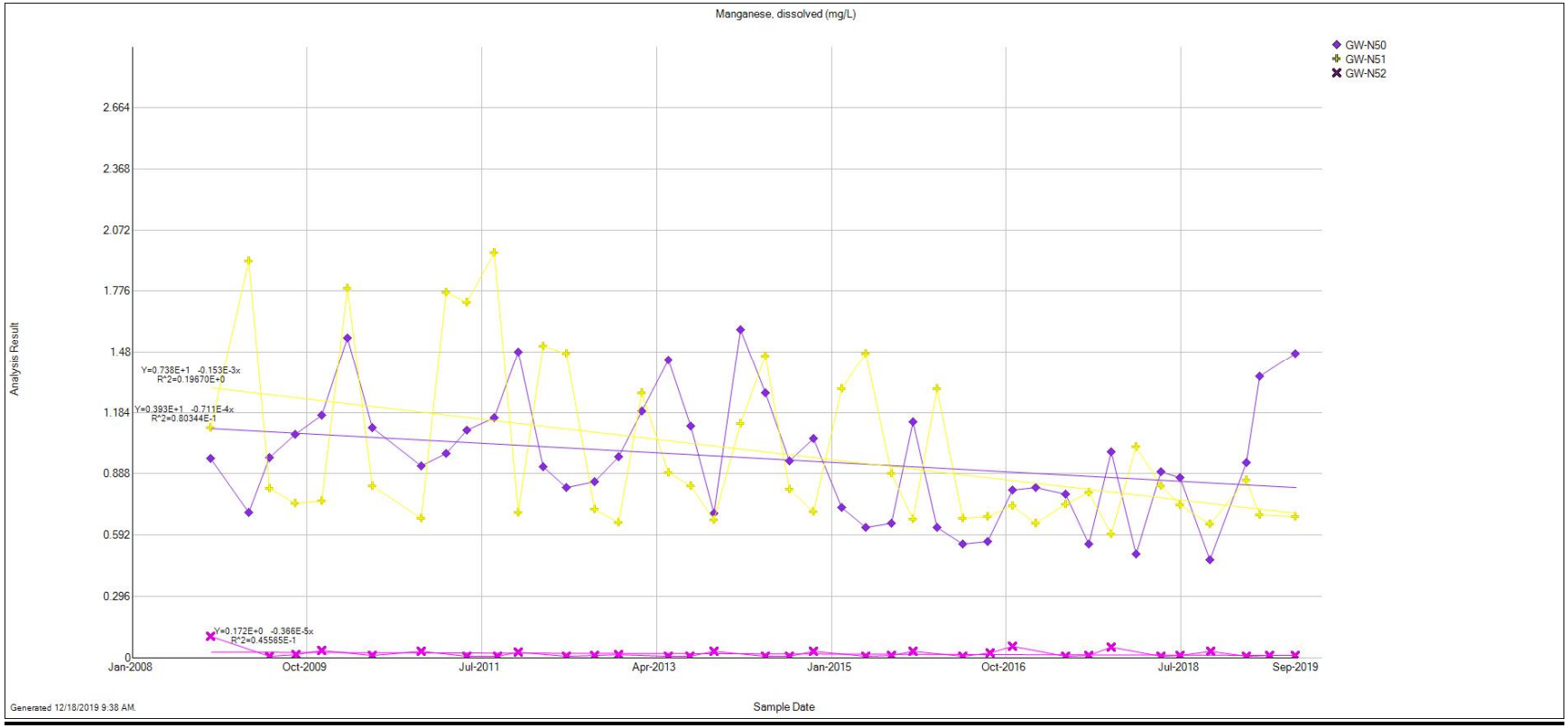
Appendix 4
Groundwater Monitoring Graphs

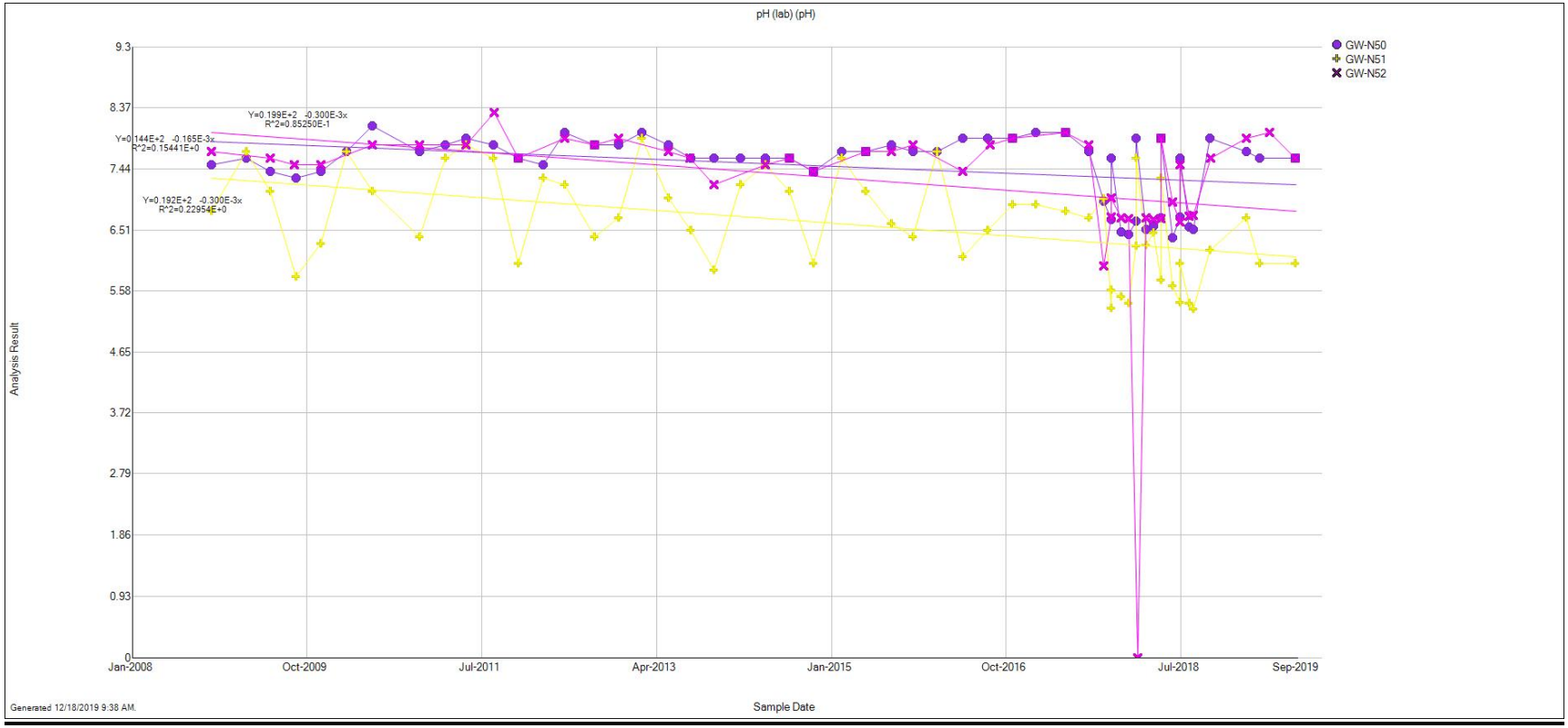

Calcium, dissolved (mg/L)
GW-N50
GW-N51
GW-N52
Y=0.421E+3 -0.222E-2x
R^2=0.27940E-2
Y=0.649E+3 -0.115E-1x
R^2=0.15304E+0
Y=0.591E+3 -0.114E-1x
R^2=0.41266E+0
Analysis Result
510
459
408
357
306
255
204
153
102
51
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:38 AM.
Sample Date

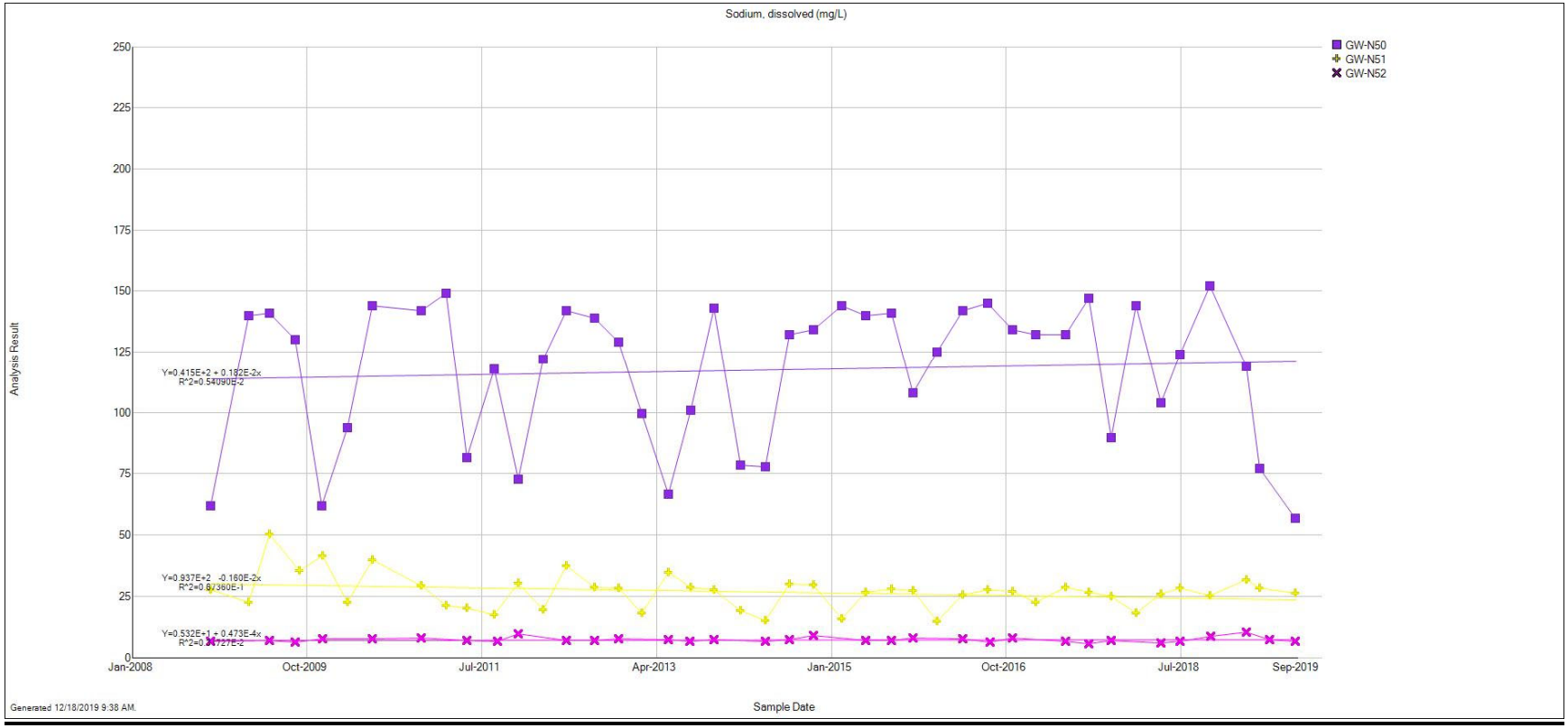

Specific Conductance @ 25C (lab) (umhos/cm)
GW-N50
GW-N51
GW-N52
Y=0.324E+4 -0.166E-1x
R^2=0.26263E-2
Y=0.290E+4 -0.446E-1x
R^2=0.19616E+0
Y=0.249E+4 -0.385E-1x
R^2=0.10706E+0
Analysis Result
4200
3780
3360
2940
2520
2100
1680
1260
840
420
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:38 AM.
Sample Date

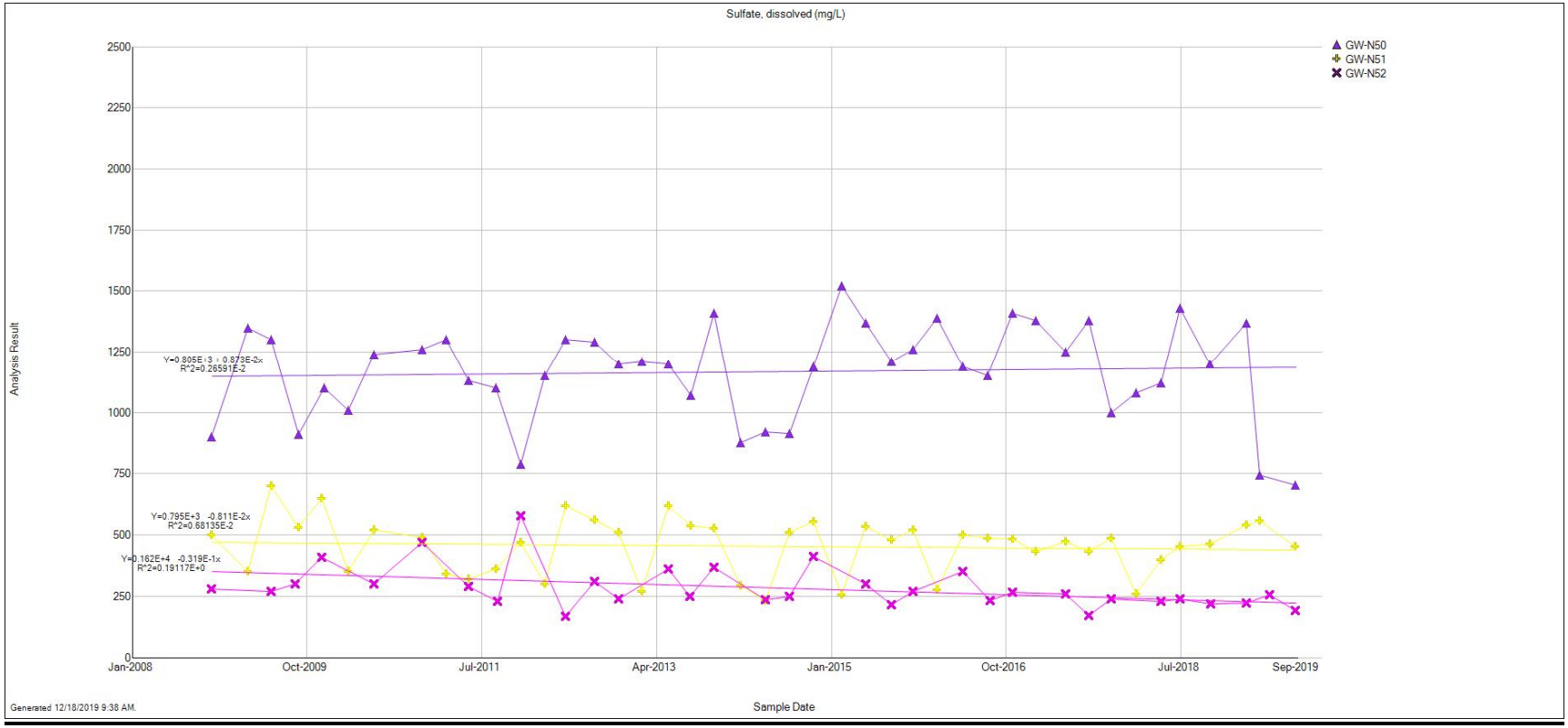

Iron, total recoverable (ug/L)
GW-N50
GW-N51
GW-N52
67000
298.19255
3596.3851
394.57765
192.77021
490.96276
789.15531
387.34786
385.54041
383.73296
-18.07448
Analysis Result
Y=0.229E+5 -0.819E-1x
R^2=0.40238E-4
Y=-0.143E+5 + 0.514E+0x
R^2=0.19783E-1
Y=0.212E+4 -0.489E-1x
R^2=0.15326E+0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:38 AM.

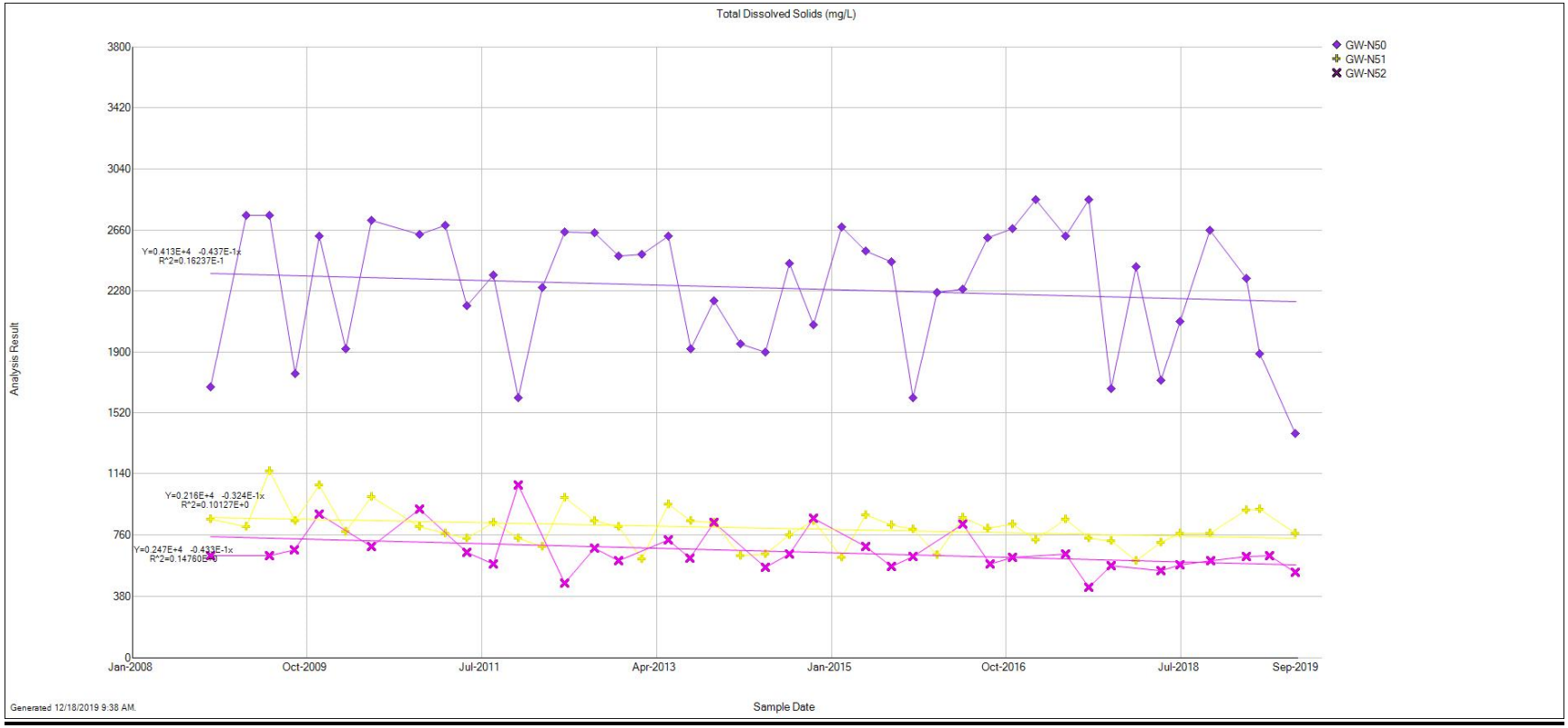

Magnesium, dissolved (mg/L)
GW-N50
GW-N51
GW-N52
Y=0.220E+2 + 0.367E-2x
R^2=0.12566E-1
Y=0.184E+3 -0.319E-2x
R^2=0.14474E+0
Y=0.458E+2 -0.657E-3x
R^2=0.39613E-1
Analysis Result
330
297
264
231
198
165
132
99
66
33
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:38 AM.

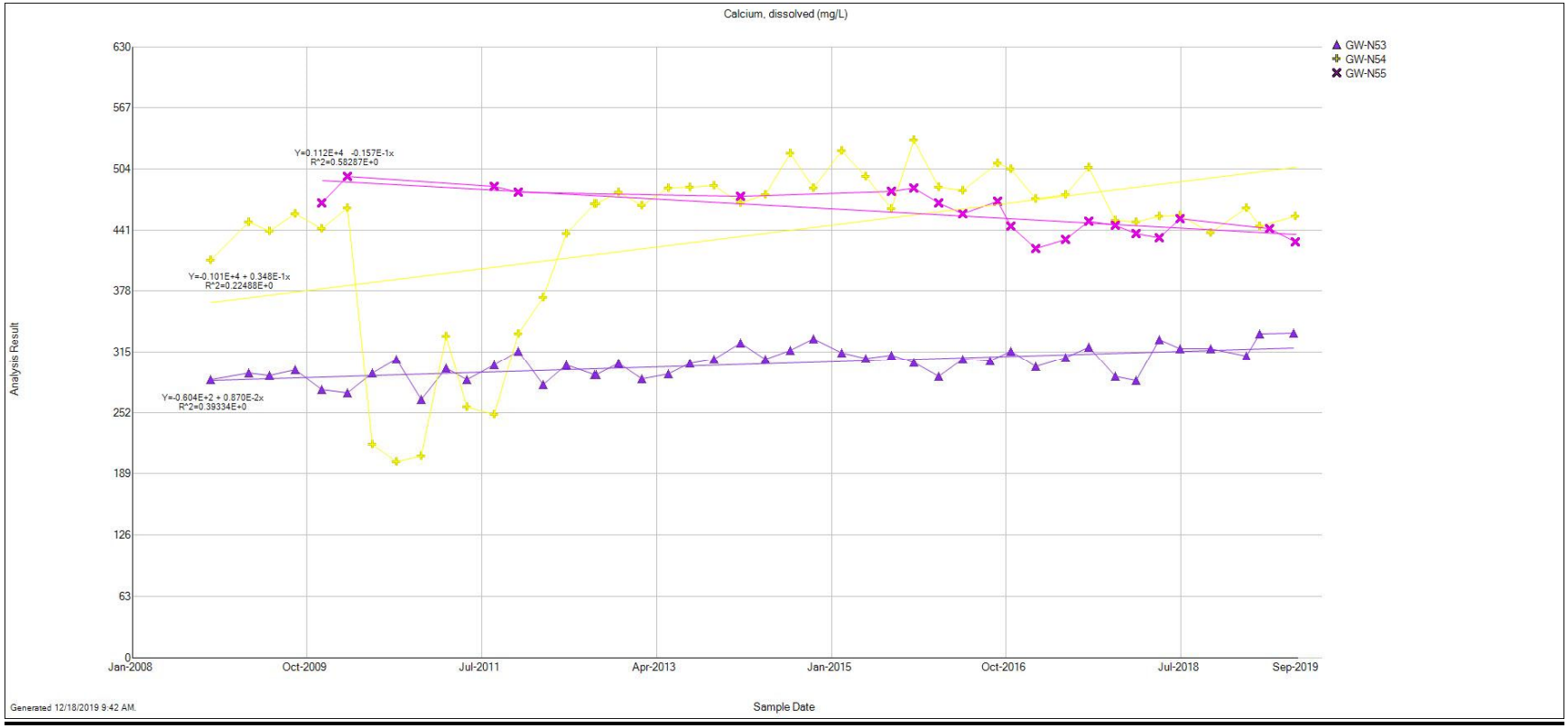

Manganese, dissolved (mg/L)
GW-N50
GW-N51
GW-N52
Analysis Result
2.664
2.368
2.072
1.776
1.48
1.184
0.888
0.592
0.296
0
Y=0.738E+1 -0.153E-3x
R^2=0.19670E+0
Y=0.393E+1 -0.711E-4x
R^2=0.80344E-1
Y=0.172E+0 -0.366E-5x
R^2=0.45585E-1
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:38 AM.
Sample Date

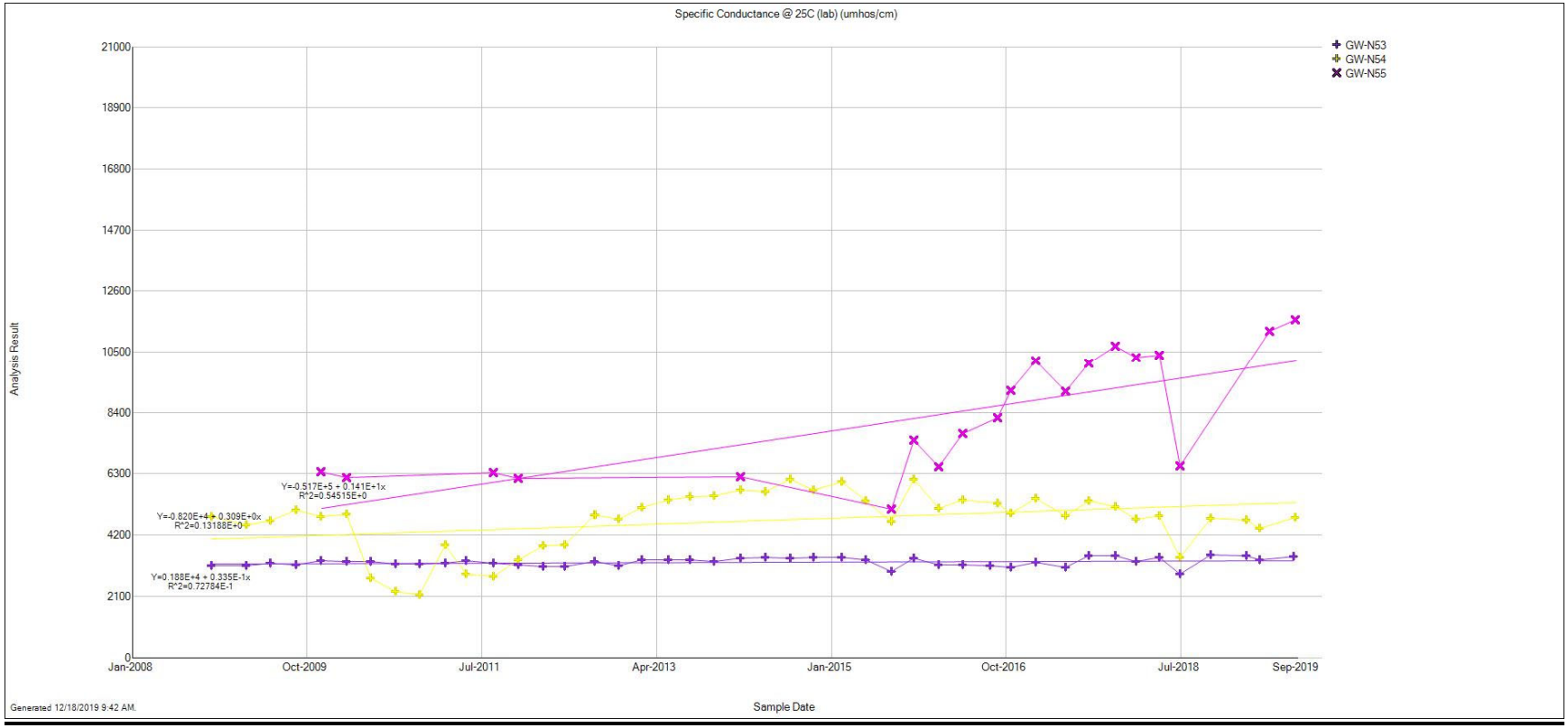

pH (lab) (pH)
GW-N50
GW-N51
GW-N52
Y=0.199E+2 -0.300E-3x
R^2=0.85250E-1
Y=0.144E+2 -0.165E-3x
R^2=0.15441E+0
Y=0.192E+2 -0.300E-3x
R^2=0.22954E+0
9.3
8.37
7.44
6.51
5.58
4.65
3.72
2.79
1.86
0.93
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Analysis Result
Sample Date
Generated 12/18/2019 9:38 AM.

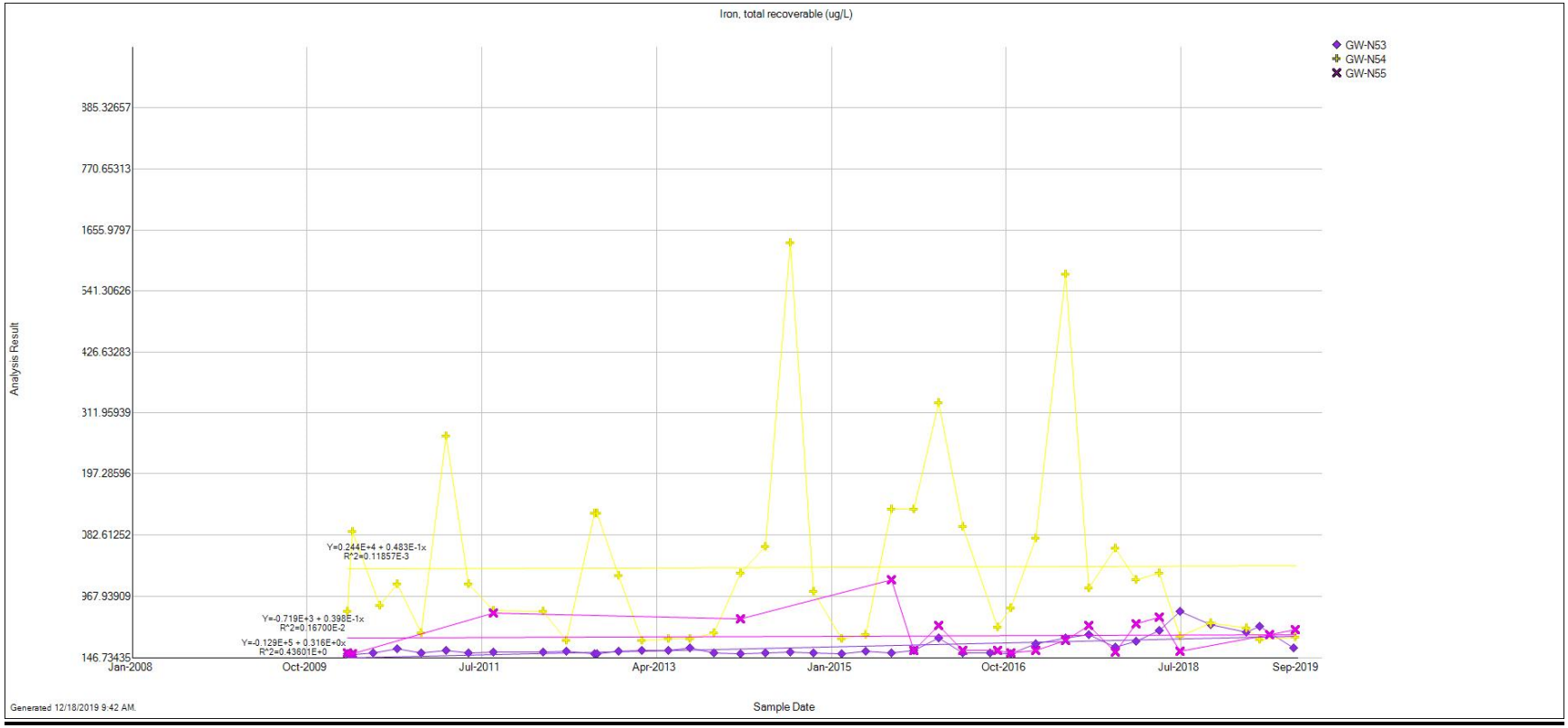

Sodium, dissolved (mg/L)
GW-N50
GW-N51
GW-N52
Analysis Result
250
225
200
175
150
125
100
75
50
25
0
Y=0.415E+2 + 0.182E-2x
R^2=0.540905-2
Y=0.937E+2 -0.160E-2x
R^2=0.87360E-1
Y=0.532E+1 + 0.473E-4x
R^2=0.4727E-2
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:38 AM.
Sample Date

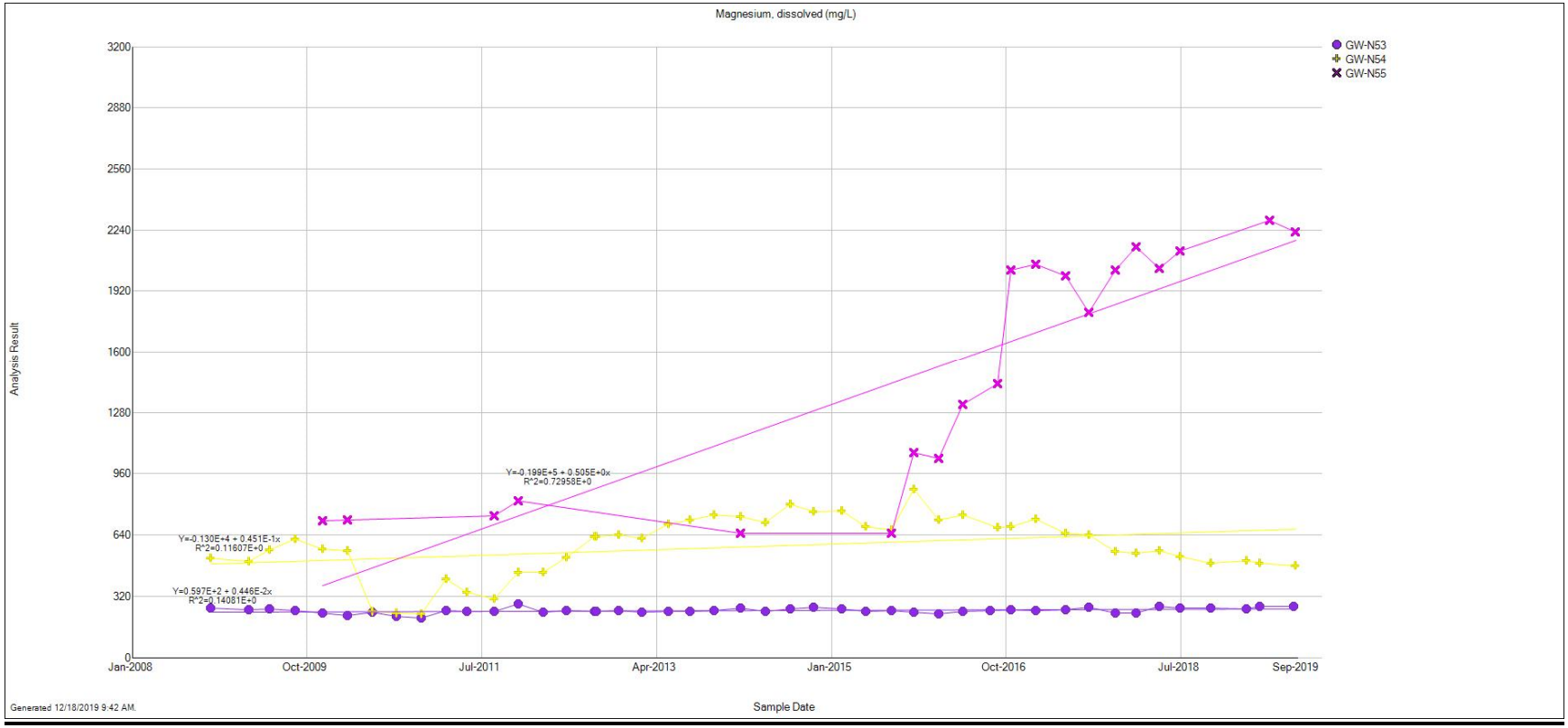

Sulfate, dissolved (mg/L)
GW-N50
GW-N51
GW-N52
Analysis Result
2500
2250
2000
1750
1500
1250
1000
750
500
250
0
Y=0.805E-3 + 0.873E-2x
R^2=0.26591E-2
Y=0.795E+3 -0.811E-2x
R^2=0.68135E-2
Y=0.162E+4 -0.319E-1x
R^2=0.19117E+0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:38 AM.
Sample Date

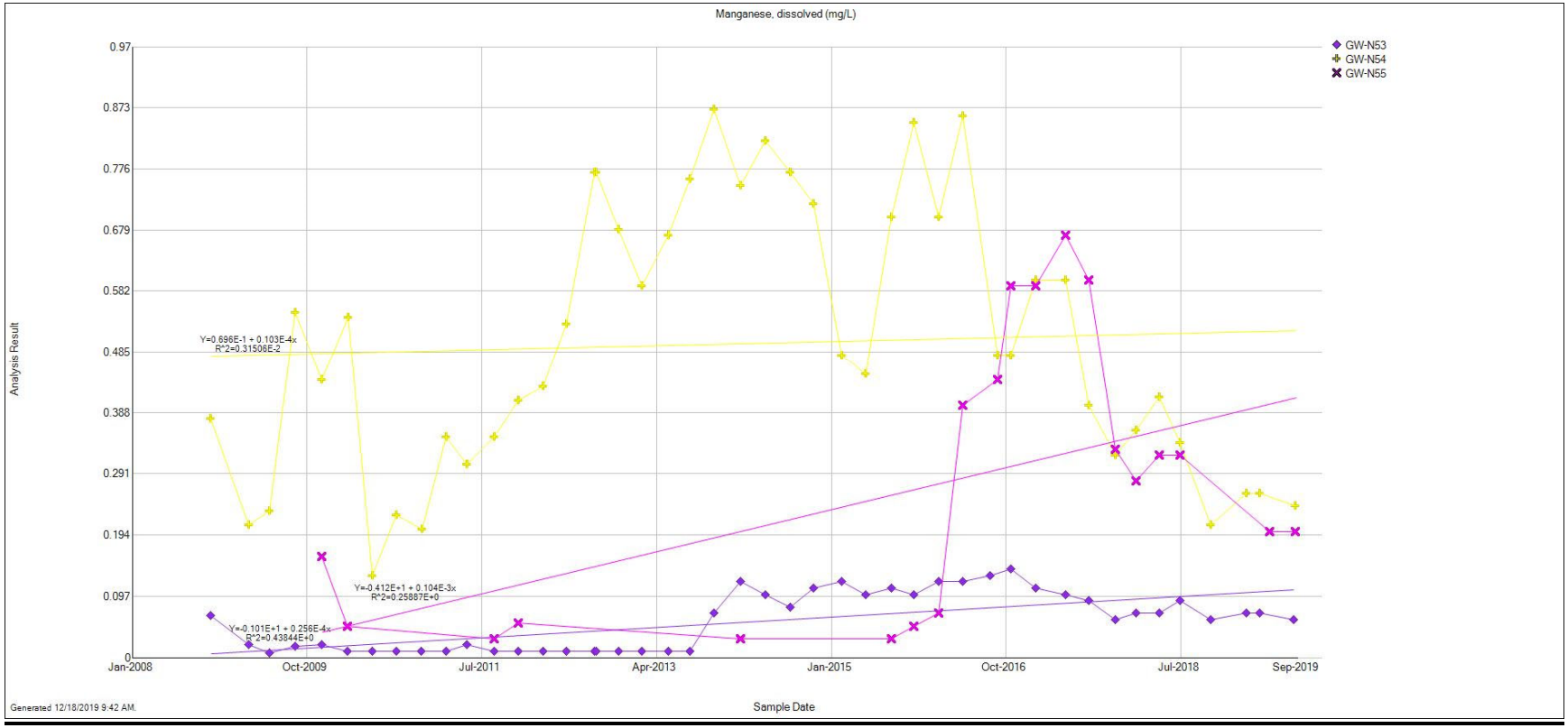

Total Dissolved Solids (mg/L)
GW-N50
GW-N51
GW-N52
Y=0.413E+4 -0.437E-1x
R^2=0.16237E-1
Y=0.216E+4 -0.324E-1x
R^2=0.10127E+0
Y=0.247E+4 -0.433E-1x
R^2=0.14760E+0
Analysis Result
3800
3420
3040
2660
2280
1900
1520
1140
760
380
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:38 AM.

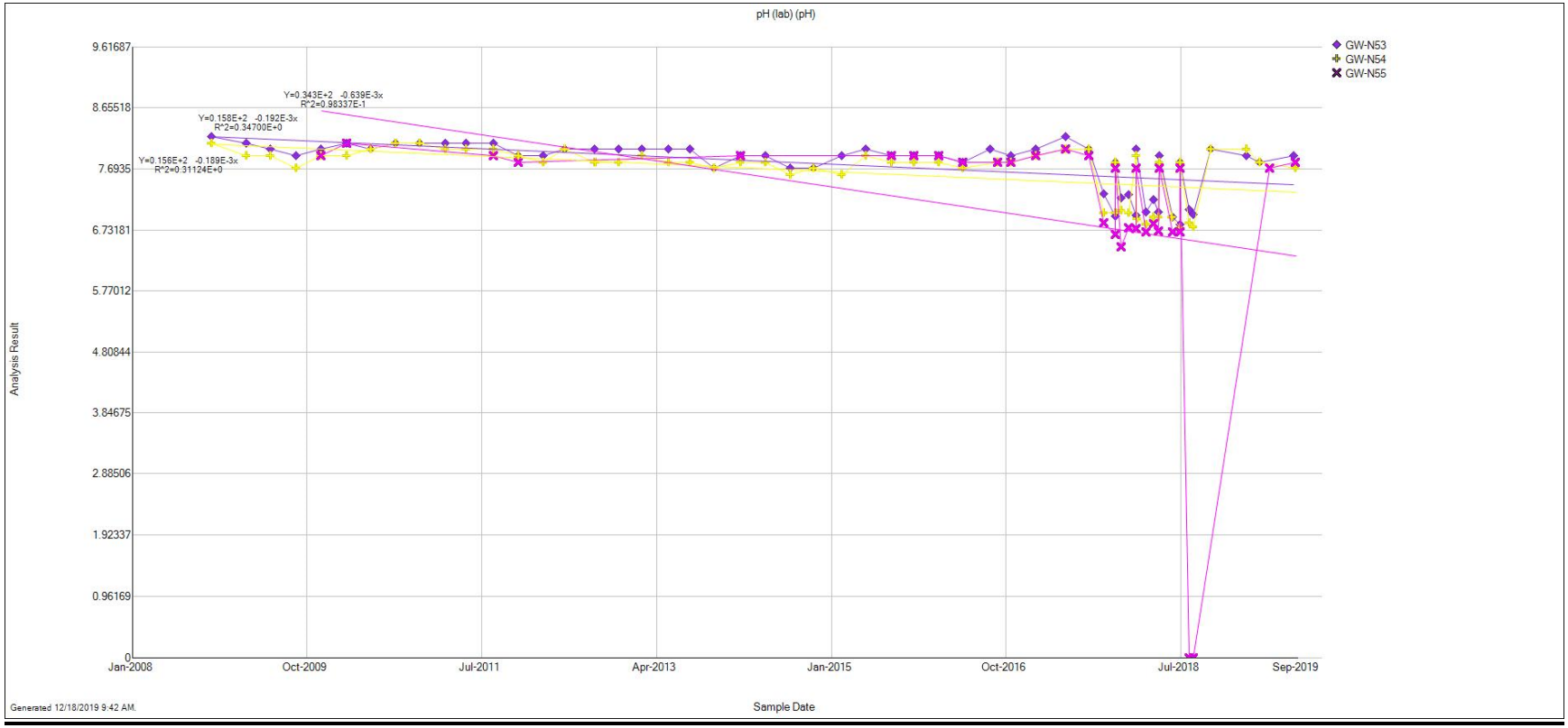

Calcium, dissolved (mg/L)
GW-N53
GW-N54
GW-N55
Y=0.112E+4 -0.157E-1x
R^2=0.58287E+0
Y=-0.101E+4 + 0.348E-1x
R^2=0.22488E+0
Y=-0.604E+2 + 0.870E-2x
R^2=0.39334E+0
630
567
504
441
378
315
252
189
126
63
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Analysis Result
Sample Date
Generated 12/18/2019 9:42 AM.

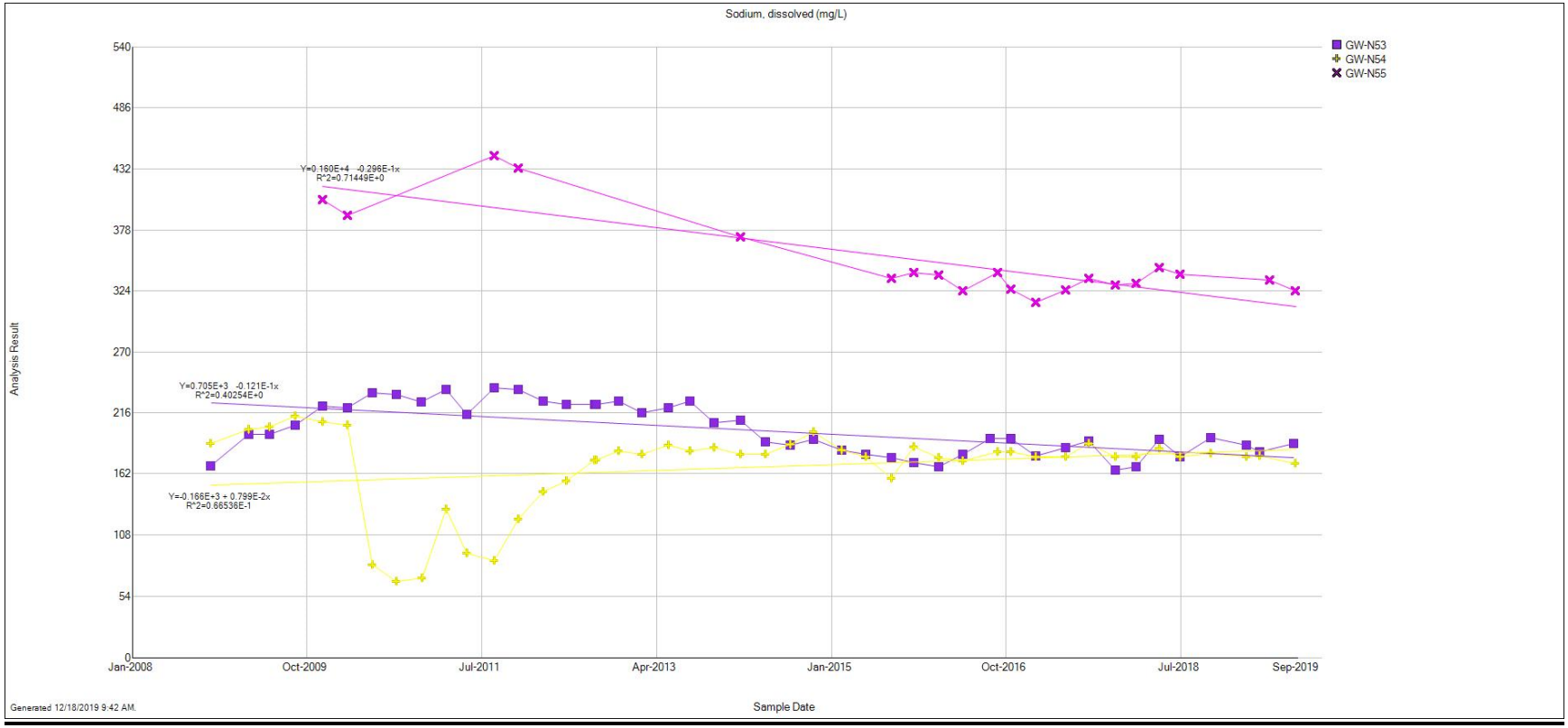

Specific Conductance @ 25C (lab) (umhos/cm)
GW-N53
GW-N54
GW-N55
Analysis Result
21000
18900
16800
14700
12600
10500
8400
6300
4200
2100
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Y=-0.517E+5 + 0.141E+1x
R^2=0.54515E+0
Y=-0.820E+4 + 0.309E+0x
R^2=0.13188E+0
Y=0.188E+4 + 0.335E-1x
R^2=0.72784E-1
Generated 12/18/2019 9:42 AM.
Sample Date

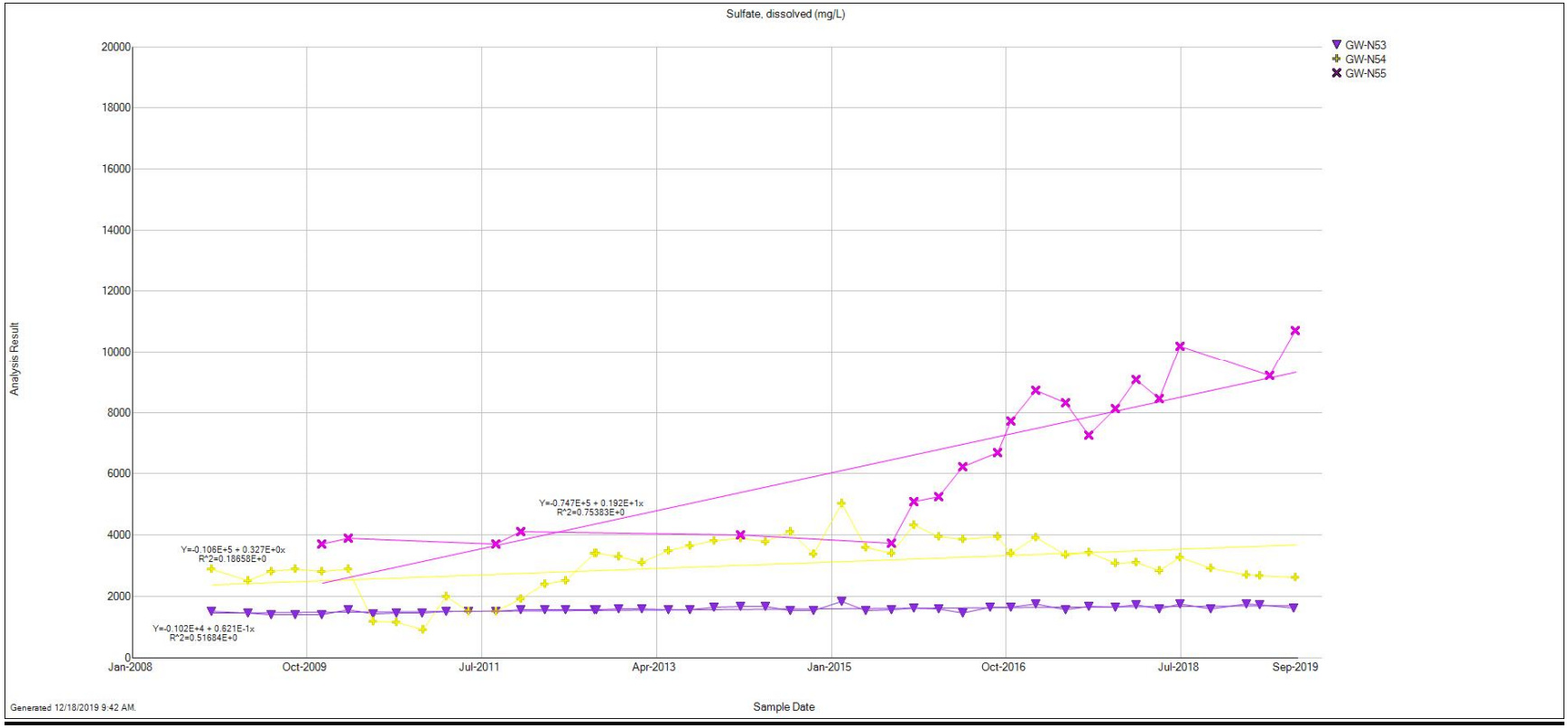

Iron, total recoverable (ug/L)
GW-N53
GW-N54
GW-N55
385.32657
770.65313
1655.9797
541.30626
426.63283
311.95939
197.28596
382.61252
967.93909
146.73435
Analysis Result
Y=0.244E+4 + 0.483E-1x
R^2=0.11857E-3
Y=-0.719E+3 + 0.398E-1x
R^2=0.16700E-2
Y=-0.129E+5 + 0.316E+0x
R^2=0.43601E+0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:42 AM.
Sample Date

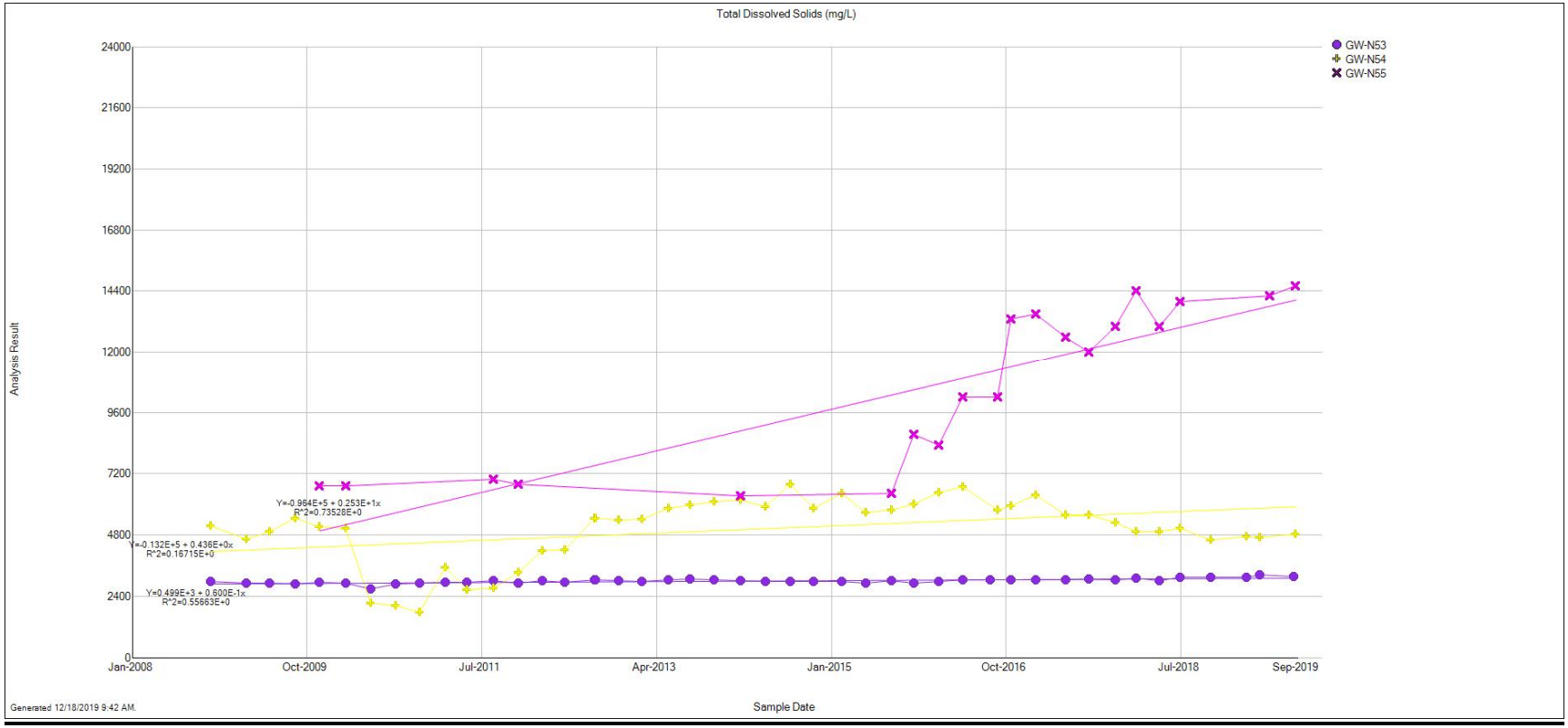

Magnesium, dissolved (mg/L)
GW-N53
GW-N54
GW-N55
Y=-0.199E+5 + 0.505E+0x
R^2=0.72958E+0
Y=-0.130E+4 + 0.451E-1x
R^2=0.11607E+0
Y=0.597E+2 + 0.446E-2x
R^2=0.14081E+0
Analysis Result
3200
2880
2560
2240
1920
1600
1280
960
640
320
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:42 AM.
Sample Date

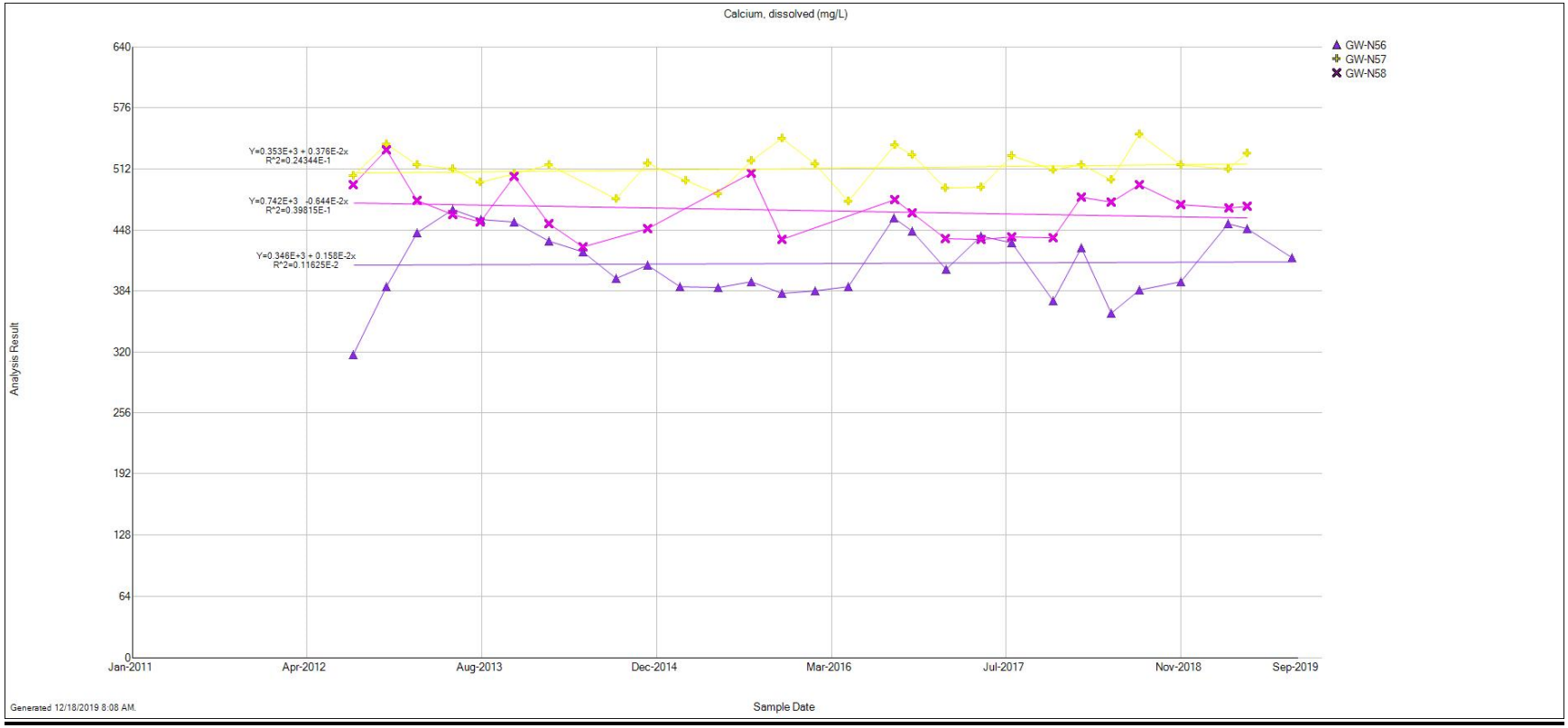

Manganese, dissolved (mg/L)
GW-N53
GW-N54
GW-N55
Analysis Result
0.97
0.873
0.776
0.679
0.582
0.485
0.388
0.291
0.194
0.097
0
Y=0.696E-1 + 0.103E-4x
R^2=0.31508E-2
Y=-0.412E+1 + 0.104E-3x
R^2=0.25887E+0
Y=-0.101E+1 + 0.256E-4x
R^2=0.43844E+0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:42 AM.
Sample Date

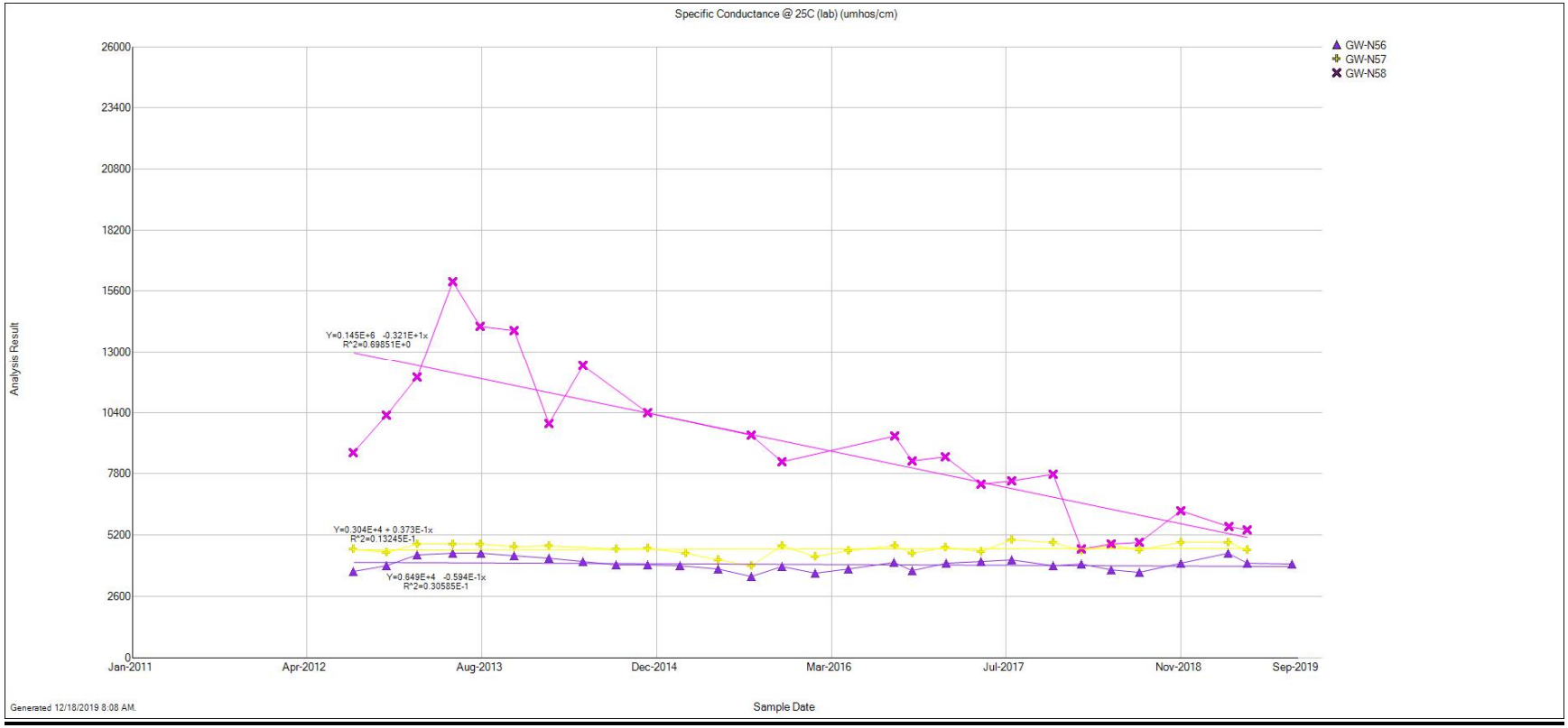

pH (lab) (pH)
GW-N53
GW-N54
GW-N55
Y=0.343E+2 -0.639E-3x
R^2=0.98337E-1
Y=0.158E+2 -0.192E-3x
R^2=0.34700E+0
Y=0.156E+2 -0.189E-3x
R^2=0.31124E+0
9.61687
8.65518
7.6935
6.73181
5.77012
4.80844
3.84675
2.88506
1.92337
0.96169
0
Analysis Result
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Sample Date
Generated 12/18/2019 9:42 AM.

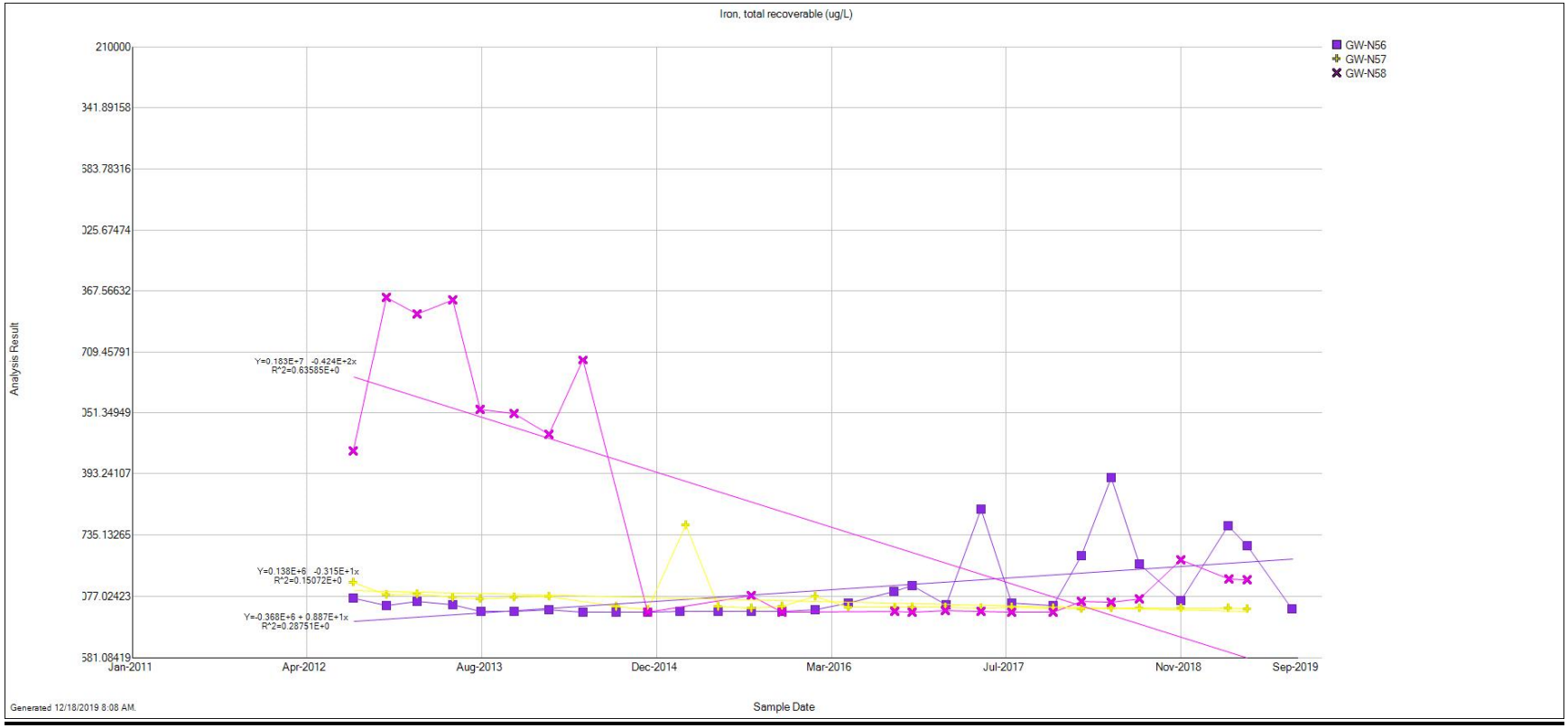

Sodium, dissolved (mg/L)
GW-N53
GW-N54
GW-N55
Y=0.160E+4 -0.296E-1x
R^2=0.71449E+0
Y=0.705E+3 -0.121E-1x
R^2=0.40254E+0
Y=-0.166E+3 + 0.799E-2x
R^2=0.66536E-1
Analysis Result
540
486
432
378
324
270
216
162
108
54
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:42 AM.
Sample Date

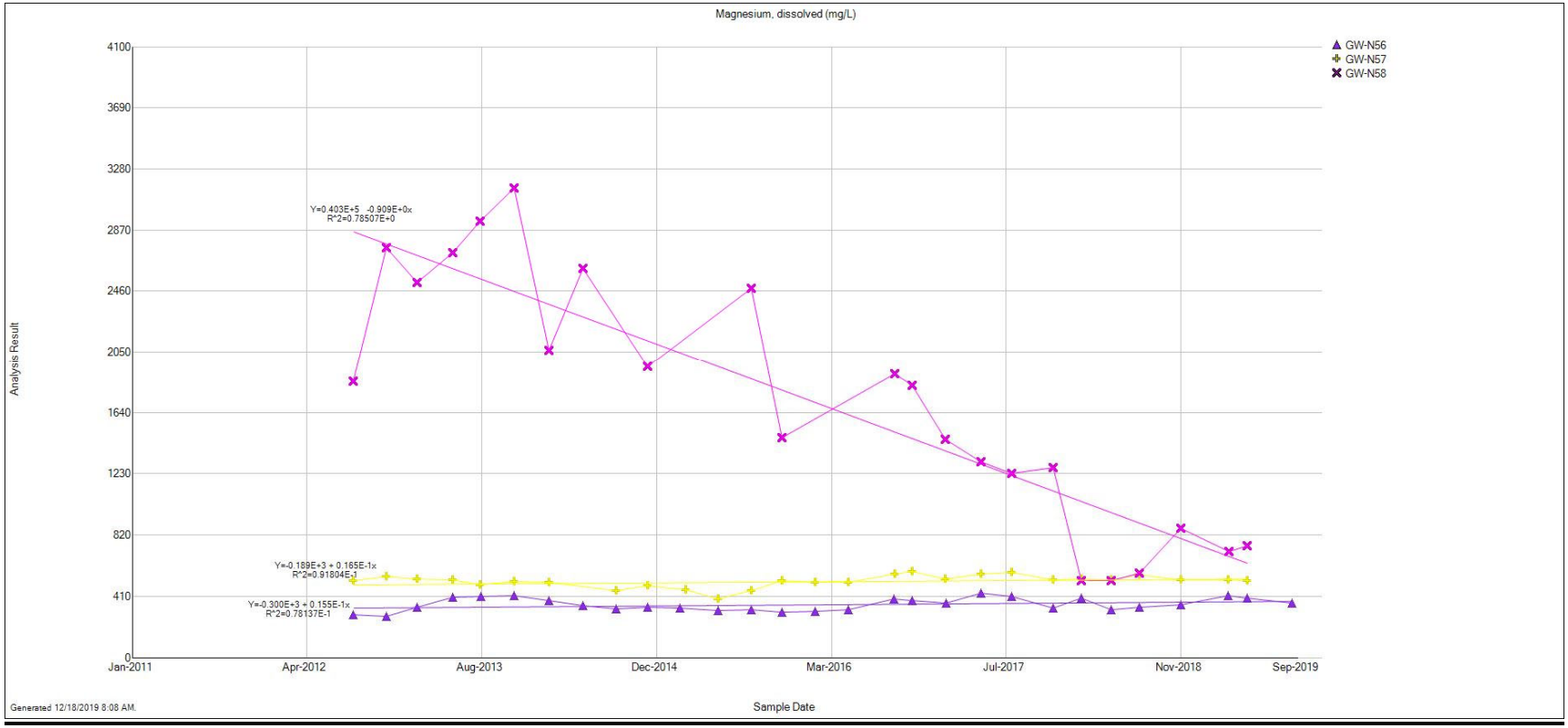

Sulfate, dissolved (mg/L)
GW-N53
GW-N54
GW-N55
Analysis Result
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Y=-0.747E+5 + 0.192E+1x
R^2=0.75383E+0
Y=-0.106E+5 + 0.327E+0x
R^2=0.18659E+0
Y=-0.102E+4 + 0.621E-1x
R^2=0.51684E+0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Generated 12/18/2019 9:42 AM.
Sample Date

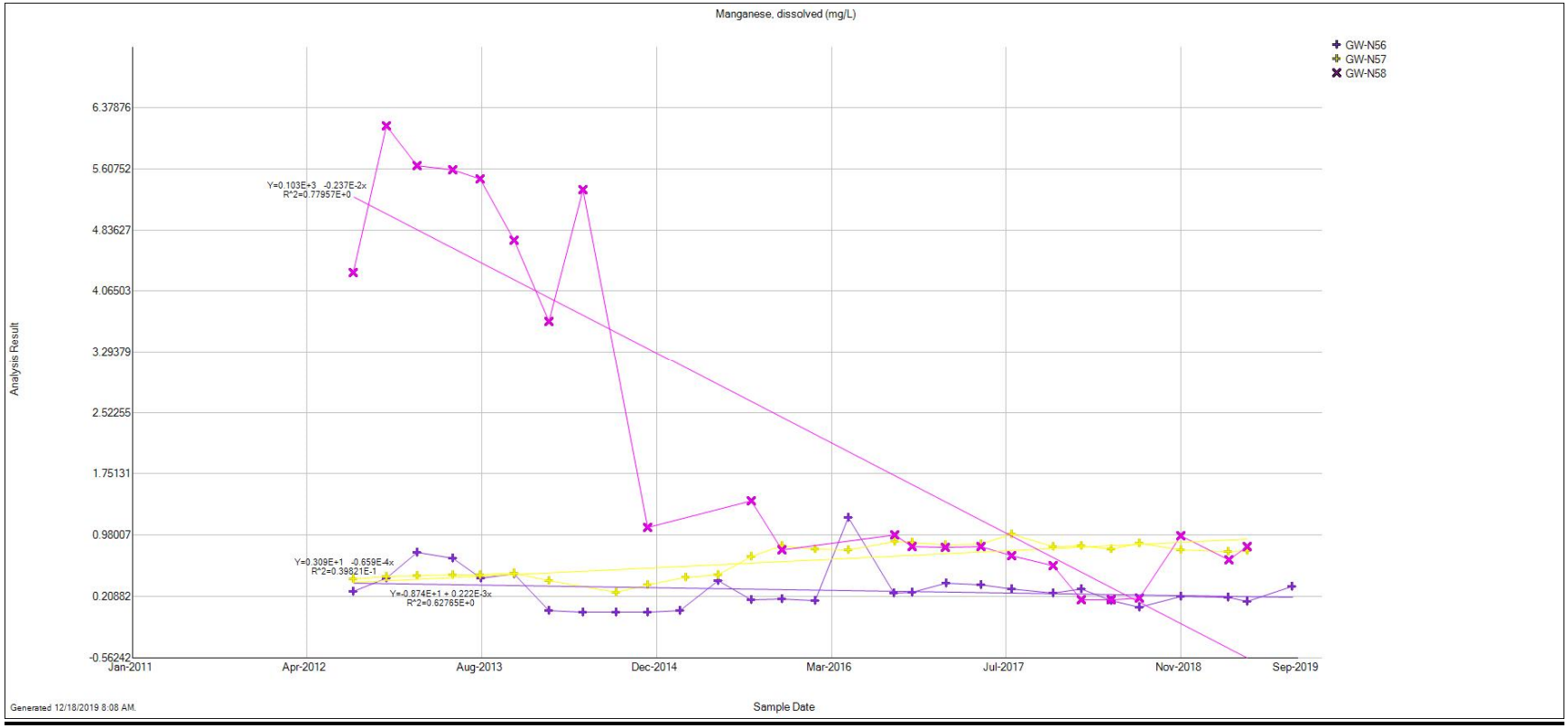

Total Dissolved Solids (mg/L)
GW-N53
GW-N54
GW-N55
Analysis Result
24000
21600
19200
16800
14400
12000
9600
7200
4800
2400
0
Jan-2008
Oct-2009
Jul-2011
Apr-2013
Jan-2015
Oct-2016
Jul-2018
Sep-2019
Y=-0.964E+5 + 0.253E+1x
R^2=0.73528E+0
Y=-0.132E+5 + 0.436E+0x
R^2=0.16715E+0
Y=0.499E+3 + 0.600E-1x
R^2=0.55663E+0
Generated 12/18/2019 9:42 AM.
Sample Date

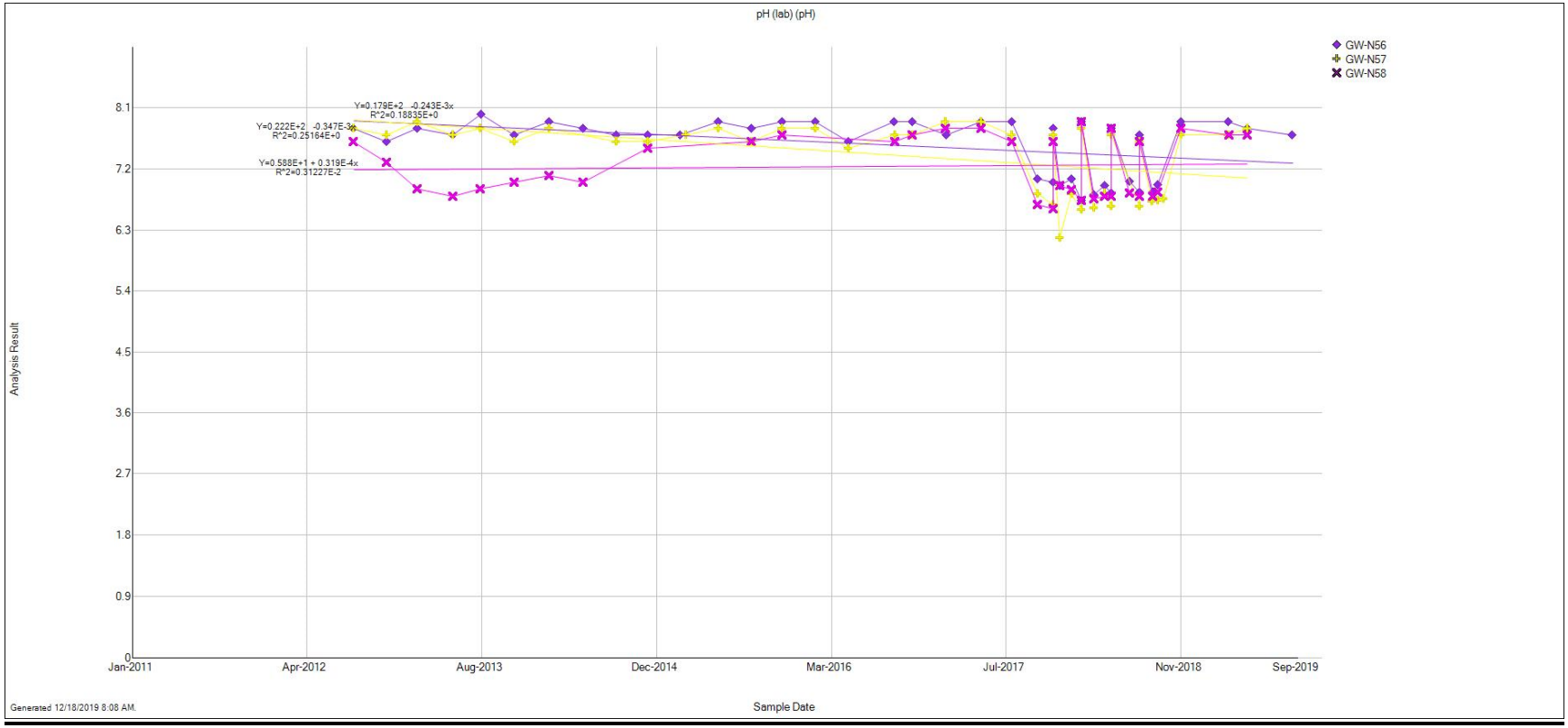

Calcium, dissolved (mg/L)
GW-N56
GW-N57
GW-N58
Y=0.353E+3 + 0.378E-2x
R^2=0.24344E-1
Y=0.742E+3 -0.644E-2x
R^2=0.39815E-1
Y=0.346E+3 + 0.158E-2x
R^2=0.11625E-2
640
576
512
448
384
320
256
192
128
64
0
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Analysis Result
Sample Date
Generated 12/18/2019 8:08 AM.

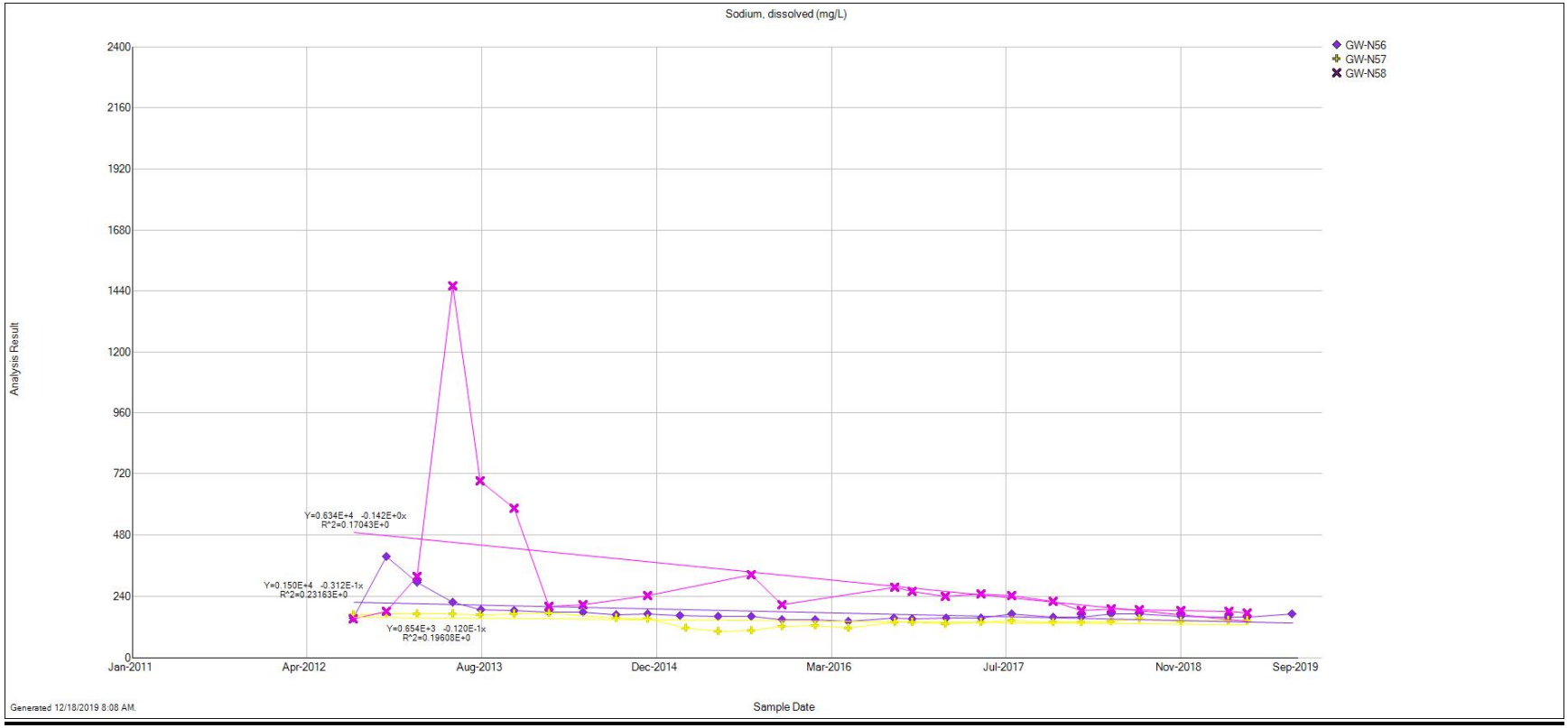

Specific Conductance @ 25C (lab) (umhos/cm)
GW-N56
GW-N57
GW-N58
Y=0.145E+6 -0.321E+1x
R^2=0.69851E+0
Y=0.304E+4 + 0.373E-1x
R^2=0.13245E-1
Y=0.649E+4 -0.594E-1x
R^2=0.30585E-1
Analysis Result
26000
23400
20800
18200
15600
13000
10400
7800
5200
2600
0
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 8:08 AM.
Sample Date

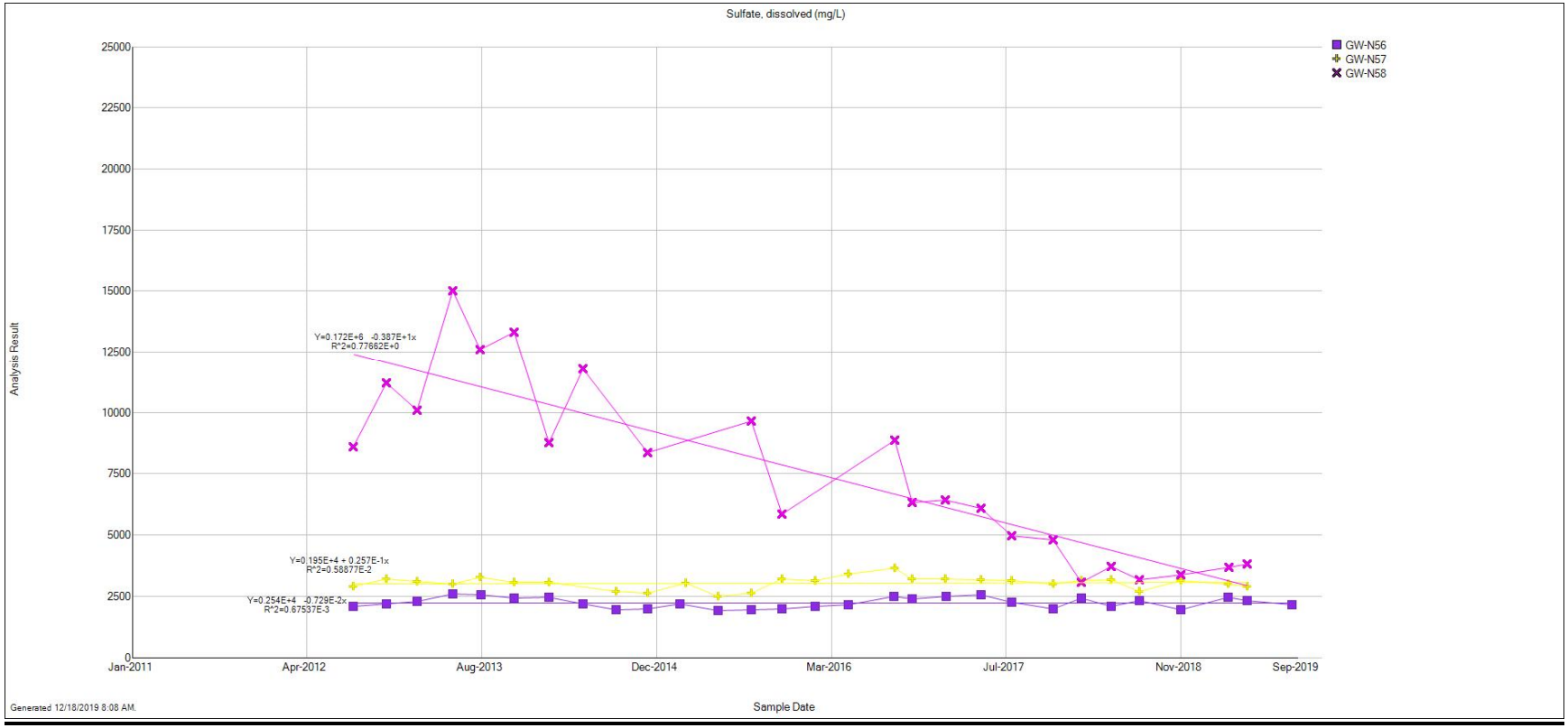

Iron, total recoverable (ug/L)
GW-N56
GW-N57
GW-N58
Y=0.183E+7 -0.424E+2x
R^2=0.63585E+0
Y=0.138E+6 -0.315E+1x
R^2=0.15072E+0
Y=-0.368E+6 + 0.887E+1x
R^2=0.28751E+0
210000
341.89158
583.78316
825.67474
1067.56632
1309.45791
1551.34949
1793.24107
2035.13265
2277.02423
2518.91581
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Analysis Result
Sample Date
Generated 12/18/2019 8:08 AM.

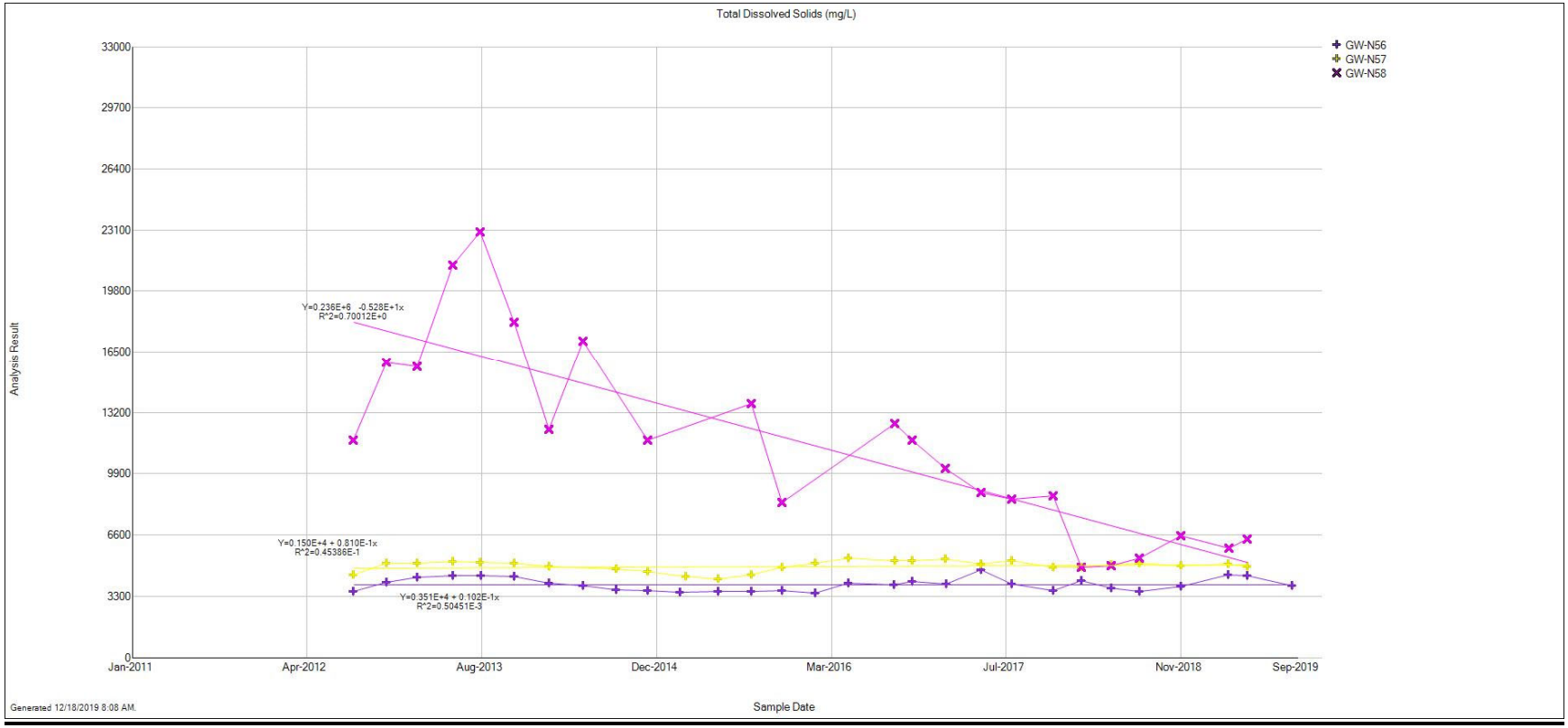

Magnesium, dissolved (mg/L)
GW-N56
GW-N57
GW-N58
Y=0.403E+5 -0.909E+0x
R^2=0.78507E+0
Y=-0.189E+3 + 0.165E-1x
R^2=0.91804E-1
Y=-0.300E+3 + 0.155E-1x
R^2=0.78137E-1
Analysis Result
4100
3690
3280
2870
2460
2050
1640
1230
820
410
0
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 8:08 AM.
Sample Date


Manganese, dissolved (mg/L)
GW-N56
GW-N57
GW-N58
Y=0.103E+3 -0.237E-2x
R^2=0.77957E+0
Y=0.309E+1 -0.659E-4x
R^2=0.39821E-1
Y=-0.874E+1 + 0.222E-3x
R^2=0.62765E+0
6.37876
5.60752
4.83627
4.06503
3.29379
2.52255
1.75131
0.98007
0.20882
-0.56242
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Analysis Result
Sample Date
Generated 12/18/2019 8:08 AM.


pH (lab) (pH)
GW-N56
GW-N57
GW-N58
Y=0.179E+2 -0.243E-3x
R^2=0.18835E+0
Y=0.222E+2 -0.347E-3x
R^2=0.25164E+0
Y=0.588E+1 + 0.319E-4x
R^2=0.31227E-2
Analysis Result
8.1
7.2
6.3
5.4
4.5
3.6
2.7
1.8
0.9
0
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 8:08 AM.
Sample Date


Sodium, dissolved (mg/L)
GW-N56
GW-N57
GW-N58
Analysis Result
2400
2160
1920
1680
1440
1200
960
720
480
240
0
Y=0.634E+4 -0.142E+0x
R^2=0.17043E+0
Y=0.150E+4 -0.312E-1x
R^2=0.23163E+0
Y=0.654E+3 -0.120E-1x
R^2=0.19608E+0
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 8:08 AM.
Sample Date


Sulfate, dissolved (mg/L)
GW-N56
GW-N57
GW-N58
Y=0.172E+6 -0.387E+1x
R^2=0.77682E+0
Y=0.195E+4 + 0.257E-1x
R^2=0.58877E-2
Y=0.254E+4 -0.729E-2x
R^2=0.67537E-3
Analysis Result
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 8:08 AM.
Sample Date


Total Dissolved Solids (mg/L)
GW-N56
GW-N57
GW-N58
Analysis Result
33000
29700
26400
23100
19800
16500
13200
9900
6600
3300
0
Y=0.236E+6 -0.528E+1x
R^2=0.70012E+0
Y=0.150E+4 + 0.810E-1x
R^2=0.45386E-1
Y=0.351E+4 + 0.102E-1x
R^2=0.50451E-3
Jan-2011
Apr-2012
Aug-2013
Dec-2014
Mar-2016
Jul-2017
Nov-2018
Sep-2019
Generated 12/18/2019 8:08 AM.
Sample Date