
WATER RESOURCES MONITORING
2018 ANNUAL REPORT
BLACK BUTTE COPPER PROJECT

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WATER RESOURCES MONITORING

2018 ANNUAL REPORT

BLACK BUTTE COPPER PROJECT

1.0 INTRODUCTION

Tintina Montana, Inc., a wholly owned subsidiary of Sandfire America Resources, Inc., contracted Hydrometrics, Inc. to conduct baseline water resources monitoring for the Black Butte Copper Project (Project) during 2018. The Project is located 15 miles north of White Sulphur Springs, in Meagher County, Montana (Figure 1). Baseline water resources monitoring and hydrologic investigations have been conducted at the Project since 2011 (Hydrometrics, 2015a). The monitoring and investigations are being conducted in support of permitting activities for the exploration and development of copper-bearing massive sulfide deposits within the lower Newland Formation.

Water resources monitoring for the Project consists of monthly, quarterly, and annual monitoring programs which are conducted in accordance with the 2016 Field Sampling and Analysis Plan (FSAP; Hydrometrics, 2016b). The water resources monitoring programs are summarized below and the location, sampling schedule, and description of each water resources monitoring site is listed in Table 1.

1.1 MONTHLY MONITORING PROGRAM

The monthly monitoring program includes monitoring at seven surface water sites, consisting of collecting flow and stage measurements (where staff gages are present), field parameters, and water quality samples from all sites; and monitoring at 12 spring sites (including four developed springs), consisting of collecting flow measurements and field parameters at all sites and water quality samples from 11 of the sites.

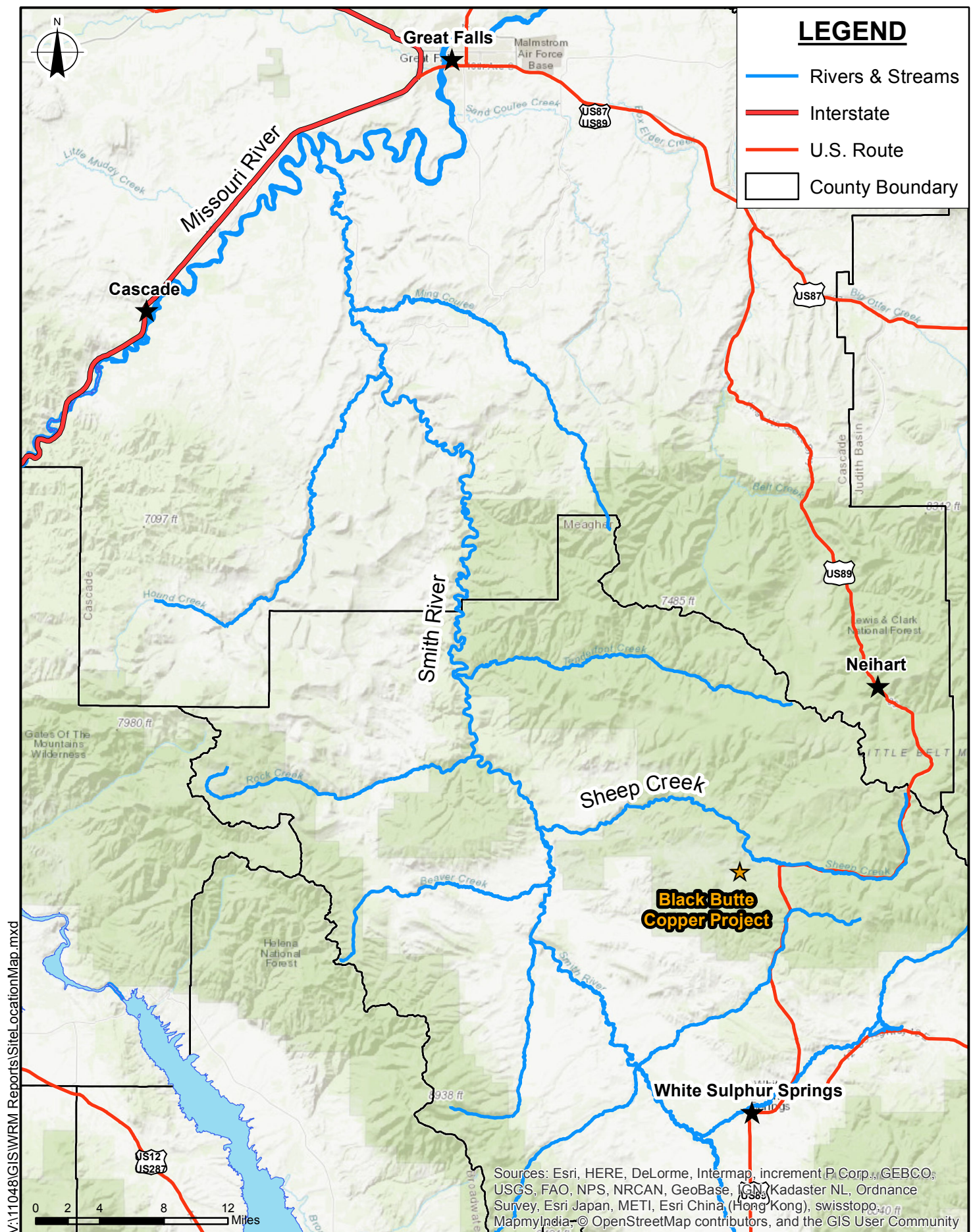


Figure 1
Location Map
Black Butte Copper Project
Meagher County, Montana

TABLE 1. BASELINE MONITORING SITE DESCRIPTION AND SUMMARY

Monitoring Site	Easting (meters)	Northing (meters)	Monitoring Frequency	Flow or Water Level	Field Parameters	Lab Analysis	Location/Monitoring Well Construction
	WGS 1984 - UTM Zone 12 N						
Surface Water Sites							
SW-1	507148	5182710	M	X	X	X	Sheep Creek - Downgradient site; at bridge on County Road 119.
SW-2	511040	5179844	M	X	X	X	Sheep Creek - Upgradient site; Highway 89 right-of-way, approximately 0.6 miles east of county road intersection.
SW-3	506996	5180581	M	X	X	X	Unnamed tributary to Sheep Creek - at intersection of County Road 119 and USFS Road 64992.
SW-4	506308	5180114	Q	X	X	--	Unnamed tributary to Sheep Creek - approximately 0.6 miles southwest of County Road 119/USFS Road 6492 intersection.
SW-5	503914	5181465	Q	X	X	X	Unnamed tributary To Butte Creek - West of Moose Pass, where jeep trail crosses drainage.
SW-6	507919	5179536	Q	X	X	X	Unnamed tributary to Little Sheep Creek - approximately 0.25 miles south of County Road 119.
SW-8	509575	5179476	Q	X	X	--	Little Sheep Creek - Approximately 0.5 miles from Highway 89.
SW-9	503944	5179271	Q	X	X	--	Butte Creek - at USFS Road 6492 crossing.
SW-10	504665	5178322	Q	X	X	--	Butte Creek - approximately 0.7 miles upstream of SW-9.
SW-11	501951	5181021	Q	X	X	X	Butte Creek - Downgradient of confluence with Unnamed tributary to Butte Creek (west of Moose Pass).
SW-14	507876	5180008	M	X	X	X	Little Sheep Creek - Downstream of SW-8, approximately 1.0 miles from Highway 89.
SW-17	506919	5181218	M	X	X	X	Coon Creek - approximately 150 feet upstream of the confluence with Sheep Creek.
SW-18	507876	5180008	M	X	X	X	Coon Creek - head of drainage, upgradient of wetlands, south of USFS Road 6492.
USGS-SC1	514509	5179419	M	X	X	X	Approximately 2.4 miles upstream of SW-2 on Sheep Creek.

TABLE 1. BASELINE MONITORING SITE DESCRIPTION AND SUMMARY (CONTINUED)

Monitoring Site	Easting (meters)	Northing (meters)	Monitoring Frequency	Flow or Water Level	Field Parameters	Lab Analysis	Location/Monitoring Well Construction
	WGS 1984 - UTM Zone 12 N						
Springs							
SP-1	506283.07	5180101.39	A	X	X	--	Spring/Seep on west bank of Coon Creek approximately 150 feet downgradient of surface water site SW-4.
SP-2	505833.97	5180907.34	A	X	X	--	Spring in small unnamed tributary drainage to lower Coon Creek in SESW Section 24 T12N R06E.
SP-3	506370.58	5182241.55	M	X	X	X	Spring in small unnamed tributary to Sheep Creek in NWNE Section 24 T12N R06E.
SP-4	506425.17	5180468.94	M	X	X	X	Spring at head of unnamed tributary to Coon Creek, in E2NE Section 25 T12N R06E.
SP-5	506478.82	5178985.42	M	X	X	X	Spring in upper Brush Creek drainage (formerly known as surface water SW-7 location).
SP-6	506219.58	5181027.89	M	X	X	X	Unnamed tributary drainage near mine site, located in SESW Section 24 T12N R06E.
SP-7	507693.69	5181137.92	M	X	X	X	North side of Strawberry Butte above tributary drainage to Sheep Creek.
SP-8	507995.89	5178745.24	A	X	X	--	North of unnamed tributary to Little Sheep Creek, approximately 0.75 miles south of USFS Road 6492 in SENW Section 31 T12N R07E.
SP-9	507502.03	5178577.92	A	X	X	--	North of unnamed tributary to Little Sheep Creek, approximately 0.3 miles west-southwest of SP-8 in SWNW Section 31 T12N R07E.
SP-10	506335.42	5178351.00	M	X	X	X	Headwaters of the southfork of Brush Creek, south of proposed portal, near the center of Section 36 T12N R06E.
SP-11*	506708	5181875	M	X	X	X	Hill slope east of Sheep Creek, in the SWNE Section 24 T12N R06E.
SP-12*	507098	5180685	M	X	X	X	Hay meadow area approximately 560 feet north of County Road 116 and USFS Road 6492 intersection.
SP-13*	507567	5181875	A	X	X	--	Unnamed tributary drainage of Sheep Creek, located approximately 730 feet west of SP-7 in the SESW Section 19 T12N R07E.

TABLE 1. BASELINE MONITORING SITE DESCRIPTION AND SUMMARY (CONTINUED)

Monitoring Site	Easting (meters)	Northing (meters)	Monitoring Frequency	Flow or Water Level	Field Parameters	Lab Analysis	Location/Monitoring Well Construction
	WGS 1984 - UTM Zone 12 N						
Developed Springs							
DS-1	506507.08	5178870.81	M	X	X	X	Developed spring, near surface water site SW-7 in upper drainage of Little Sheep Creek trib.
DS-2	505263.49	5180150.61	M	X	X	--	Developed seep/spring, southeast side of Black Butte upgradient of SP-1.
DS-3	505037.62	5181520.61	M	X	X	X	South of Moose Pass in Butte Creek drainage (upgradient of surface water site SW-5).
DS-4	506056.53	5181588.64	M	X	X	X	Unnamed tributary to Sheep Creek in Section 24 T12N R06E, north of mine area and southeast of Moose Pass.
DS-5	504761.45	5182484.96	A	X	X	--	Unnamed tributary to Sheep Creek, north of Moose Pass.
DS-6	504949.66	5182827.88	A	X	X	--	Unnamed tributary to Sheep Creek, north of Moose Pass and downstream of DS-5.
Seeps							
Seep-1	507876.19	5179570.54	A	--	X	--	Seep on tributary to Little Sheep Creek (approximately 15' west of SW-6).
Seep-2	506310.6	5180089.2	A	--	X	--	Seep on east bank of Coon Creek (approximately 150 feet downgradient of SW-4).
Seep-3	507821.16	5180537.25	A	--	X	--	Seep located on eastern side of Strawberry Butte.
Seep-4	507530.57	5182486.29	A	--	X	--	Seep on hillside in SWSW Section 18 T12N R07E.
Seep-5	507768.38	5182748.77	A	--	X	--	Seep on hillside in SESW Section 18 T12N R07E.
Seep-6	507853.49	5182587.27	A	--	X	--	Seep on hillside in SESW Section 18 T12N R07E.
Seep-7	507155.4	5182821.06	A	--	X	--	Seep on eastern side of County Road 119 approximately 200 feet north of Sheep Creek bridge at SW-1.
Seep-8	506701.44	5180381.64	A	--	X	--	Seep area on west hillside adjacent to lower Coon Creek.
Seep-9	504825.48	5182475.68	A	--	X	--	Seep in unnamed tributary to Sheep Creek North of Moose Pass (downgradient of DS-5).

TABLE 1. BASELINE MONITORING SITE DESCRIPTION AND SUMMARY (CONTINUED)

Monitoring Site	Easting (meters)	Northing (meters)	Monitoring Frequency	Flow or Water Level	Field Parameters	Lab Analysis	Location/Monitoring Well Construction		
	WGS 1984 - UTM Zone 12 N								
Seep-10	507270.05	5179164.8	A	--	X	--	Spring in upper Brush Creek, upstream of Seep 1, in NWNW Section 31 T12N R07E.		
Monitoring Wells							Total Depth	Perforated/Screen Interval	Gravel/Sand Pack Interval
							feet, below ground surface		
MW-1A	506935.22	5180841.55	Q	X	X	X	38	25 - 34	25 - 34
MW-1B	506934.19	5180845.46	Q	X	X	X	98	88 - 98	88 - 98
MW-2A	506598.18	5180331.93	Q	X	X	X	62	52 - 62	47 - 62
MW-2B	506596.96	5180328.73	Q	X	X	X	80	70 - 80	65 - 80
MW-3	506484.07	5180740.22	Q	X	X	X	305	285 - 305	278 - 305
MW-4A	507201.47	5180855.43	Q	X	X	X	23	14-23	11 - 23
MW-4B	507200.12	5180858.49	Q	X	X	X	59	39-59	37-59
MW-6A	507809.18	5179492.85	Q	X	X	X	15	5-15	3-15
MW-6B	507792.76	5179490.71	Q	X	X	X	50	40-50	37-50
MW-7	507451.70	5179500.71	Q	X	X	X	50	40-50	37-50
MW-8	507036.00	5179398.31	Q	X	X	X	80	70-80	67-80
MW-9	506592.96	5180725.46	Q	X	X	X	143	108-128	98-144
MW-10	506578.57	5179215.05	Q	X	X	X	90	70-90	67-90
MW-11	506464.72	5179117.47	Q	X	X	X	70	50-70	46-70
MW-12	506412.82	5179010.38	Q	X	X	X	61	40-61	37-61
MW-13	506477.79	5178855.81	Q	X	X	X	40	20-40	17-40
MW-14	508255.63	5179376.77	Q	X	--	--	68	56-66	53-68
MW-15	508290.89	5179071.07	Q	X	--	--	80	70-80	66-80
MW-16	507036.30	5180586.21	Q	X	X	X	57	37-57	34-57
MW-17	506654.57	5180130.74	Q	X	X	X	75	55-75	54-78
MW-18	506257.38	5179707.93	Q	X	X	X	32	12-32	10-32
MW-19	506878.42	5178925.74	Q	X	X	X	28	8-28	6-28
MW-20	507426.69	5179631.58	Q	X	X	X	37.5	17.5-37.5	14.5-37.5
SC12-116*	507030.00	5180380.00	Q	X	--	--	--	--	--
SC15-184*	507047.34	5178972.53	Q	--	X	X	99	55-85	49-90
SC15-185*	506355.46	5179094.24	Q	X	X	X	99	60-80	56.3-85
SC15-194*	506014.14	5179854.92	Q	X	X	X	99	60-80	56.3-85
SC15-198*	506621.36	5179854.92	Q	X	X	X	99	60-70	51.7-74

TABLE 1. BASELINE MONITORING SITE DESCRIPTION AND SUMMARY (CONTINUED)

Monitoring Site	Easting (meters)	Northing (meters)	Monitoring Frequency	Flow or Water Level	Field Parameters	Lab Analysis	Location/Monitoring Well Construction		
	WGS 1984 - UTM Zone 12 N						Total Depth	Perforated/Screen Interval	Gravel/Sand Pack Interval
Test Wells							feet, below ground surface		
PW-1	506301.42	5180698.40	Q	X	--	--	213	171-211	108-213
PW-2	506443.15	5180865.03	Q	X	X	X	215	132-212	121-215
PW-3	506846.43	5180479.42	Q	X	X	X	131	90-127	80-131
PW-4	506849.44	5180701.75	Q	X	X	X	242	200-239	191-242
PW-5	506490.68	5181172.77	Q	X	--	--	565	515-555	508-560
PW-6N	506477.44	5181085.67	Q	X	--	--	1358	Open Hole	1159-1358
PW-7	507122.89	5180867.59	Q	--	X	X	1350	1306-1350	1300-1350
PW-8	506846.19	5180695.53	Q	X	X	X	184	139-179	132-179
PW-9	506598.38	5180721.88	Q	X	X	X	256	216-256	208-256
PW-10	506593.55	5180721.88	Q	X	X	X	370	319-359	310-370
Piezometers									
PZ-01	507650.01	5180255.63	Q	X	--	--	5.3	2.3-5.3	--
PZ-02	507400.72	5180778.79	Q	X	--	--	5.3	2.3-5.3	--
PZ-03	507249.21	5180618.91	Q	X	--	--	9.3	6.3-9.3	--
PZ-04	506991.74	5181110.82	Q	X	--	--	7.7	4.7-7.7	--
PZ-05	507080.04	5181214.68	Q	X	--	--	5.4	2.4-5.4	--
PZ-07A	506258.39	5180074.65	Q	X	--	--	6	3-6	--
PZ-07B	506258.47	5180075.00	Q	X	--	--	11	8-11	--
PZ-08	507090.31	5180573.81	Q	X	--	--	12	7-12	5-12
PZ-09	507883.78	5180178.58	Q	X	--	--	10	5-10	3-10
PZ-10	506590.91	5180679.01	Q	X	--	--	11	9-11	--
PZ-11R	507031.15	5180654.89	Q	X	--	--	11	9-11	--
PZ-12	506839.49	5180509.42	Q	X	--	--	7	5-7	--
PZ-13	507793.88	5180289.38	Q	X	--	--	7.5	5-7.5	--
PZ-14	507492.91	5180412.13	Q	X	--	--	5.5	3-5.5	--
PZ-15	507193.65	5180762.85	Q	X	--	--	8.5	6-8.5	--

Notes: *Northings and Eastings are approximate; SC12-116 is a core hole used for monitoring water level.

M: Monthly; Q: Quarterly; and A: Annual monitoring program frequency

Surface water, springs, and seep monitoring sites are shown on Figure 2; groundwater monitoring sites are shown on Figure 3.

1.2 QUARTERLY MONITORING PROGRAM

The quarterly monitoring program includes monitoring at seven surface water sites, consisting of collecting flow and stage measurements (where staff gages are present) and field parameters at all sites and water quality samples from three of the sites; and monitoring at 25 monitoring wells, 10 test wells, and 15 piezometers, consisting of collecting static water level (SWL) measurements at all sites and field parameters water quality samples from 32 of the wells.

1.3 ANNUAL MONITORING PROGRAM

The annual monitoring program includes monitoring at seven spring sites (included two developed springs), consisting of collecting flow measurements and field parameters at all sites; and monitoring at 10 seep sites, consisting of collecting field parameters at all sites.

The location, sampling schedule, and description of each water resources monitoring site are summarized in Table 1. The locations of the surface water, spring, and seep monitoring sites are shown on Figure 2 and the groundwater monitoring sites are shown on Figure 3. This report summarizes the results of the water resource monitoring programs conducted during 2018, including:

- Monthly monitoring in January, February, March, April, May, June, July, August, September, October, November, and December;
- Quarterly monitoring in March, June, September, and November; and
- Annual monitoring in September.

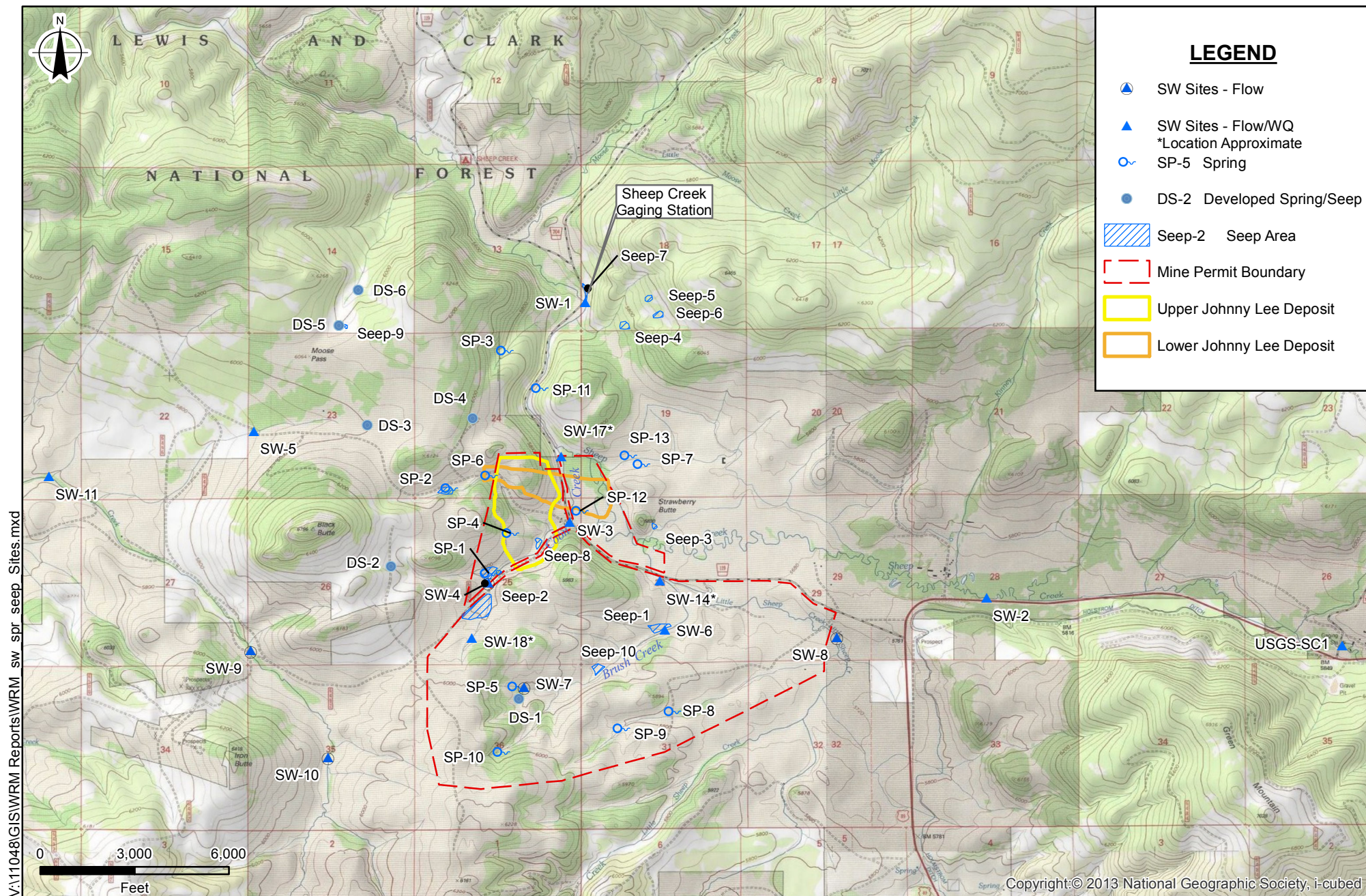
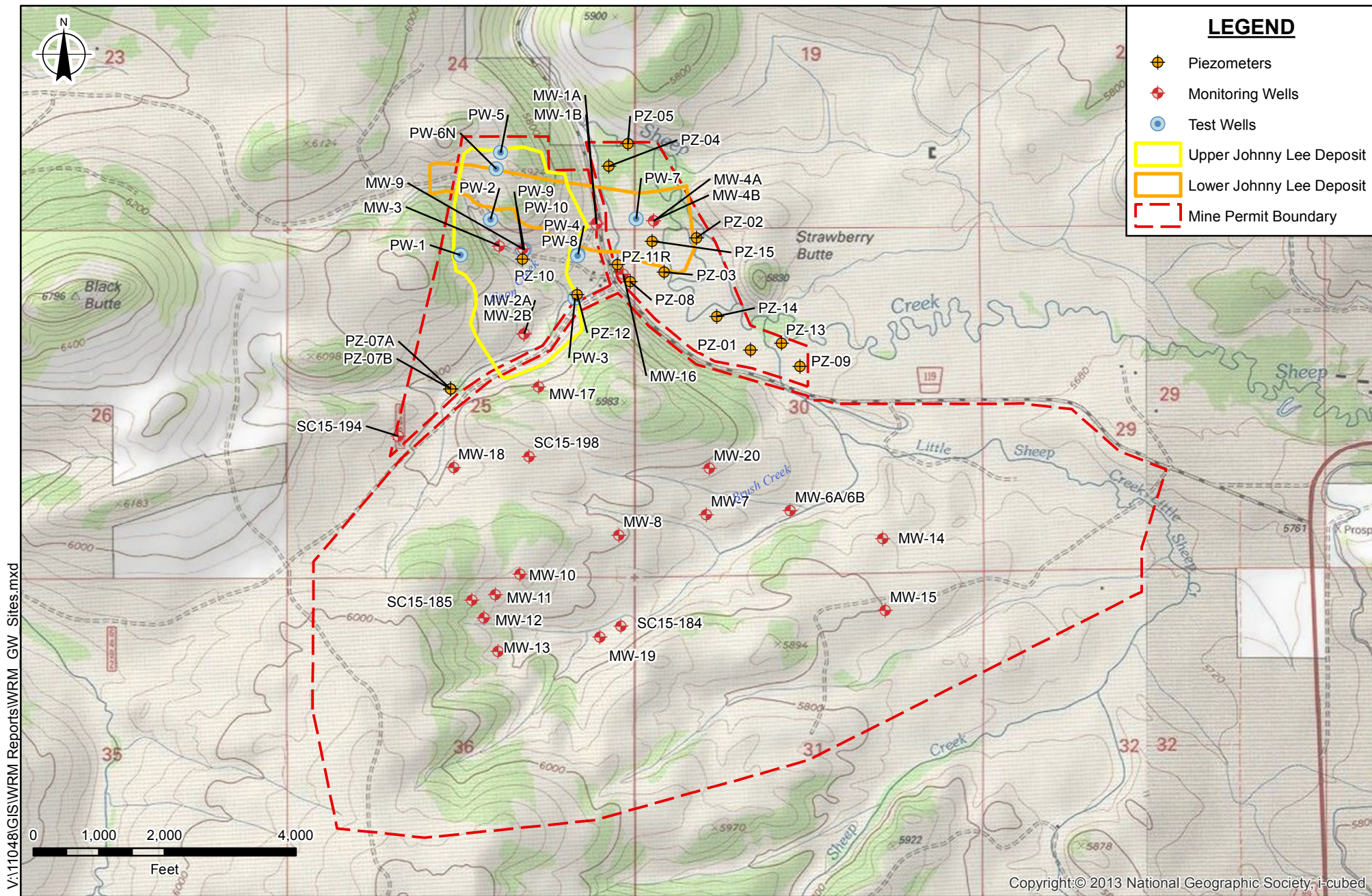


Figure 2
Surface Water and Spring Monitoring Sites
Black Butte Copper Project
Meagher County, Montana



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Figure 3
Groundwater Monitoring Sites
Black Butte Copper Project
Meagher County, Montana

Water quality samples were submitted to Energy Laboratories in Helena, Montana for analysis of physical parameters, common ions, nutrients, and a comprehensive suite of trace constituents. The water quality parameters, analytical methods, and detection limits are listed in Tables 2 and 3 for surface water and groundwater, respectively. Samples collected from springs were submitted for analysis as groundwater according to Table 3. For surface water quality samples, trace metals (with the exception of aluminum) were analyzed for the total recoverable concentration; aluminum was analyzed for the dissolved fraction. For groundwater quality samples, all trace metals were analyzed for the dissolved fraction.

**TABLE 2. PARAMETERS, METHODS, AND DETECTION LIMITS
FOR SURFACE WATER MONITORING**

Parameter	Analytical Method ⁽¹⁾	Project-Required Detection Limit (mg/L)
Physical Parameters		
TDS	SM 2540C	4
TSS	SM 2540C	4
Common Ions		
Alkalinity	SM 2320B	4
Sulfate	300.0	1
Chloride	300.0/SM 4500CL-B	1
Fluoride	A4500-F C	0.1
Calcium	215.1/200.7	1
Magnesium	242.1/200.7	1
Sodium	273.1/200.7	1
Potassium	258.1/200.7	1
Nutrients		
Nitrate+Nitrite as N	353.2	0.003
Total Persulfate Nitrogen	A 4500-N-C	0.04
Total Phosphorus	E365.1	0.003
Trace Constituents (Total Recoverable except Aluminum [Diss])⁽²⁾		
Aluminum (Al)	200.7/200.8	0.009
Antimony (Sb)	200.7/200.8	0.0005
Arsenic (As)	200.8/SM 3114B	0.001
Barium (Ba)	200.7/200.8	0.003
Beryllium (Be)	200.7/200.8	0.0008
Cadmium (Cd)	200.7/200.8	0.00003
Chromium (Cr)	200.7/200.8	0.01
Cobalt (Co)	200.7/200.8	0.01
Copper (Cu)	200.7/200.8	0.002
Iron (Fe)	200.7/200.8	0.02
Lead (Pb)	200.7/200.8	0.0003
Manganese (Mn)	200.7/200.8	0.005
Mercury (Hg)	245.2/245.1/200.8/SM 3112B	0.000005
Molybdenum (Mo)	200.7/200.8	0.002
Nickel (Ni)	200.7/200.8	0.001
Selenium (Se)	200.7/200.8/SM 3114B	0.0002
Silver (Ag)	200.7/200.8	0.0002
Strontium (Sr)	200.7/200.8	0.0002
Thallium (Tl)	200.7/200.8	0.0002
Uranium (U)	200.7/200.8	0.008
Zinc (Zn)	200.7/200.8	0.002
Field Parameters		
Stream Flow	HF-SOP-37/-44/-46	NA
Water Temperature	HF-SOP-20	0.1 °C
Dissolved Oxygen (DO)	HF-SOP-22	0.1 mg/L
pH	HF-SOP-20	0.1 s.u.
Specific Conductance (SC)	HF-SOP-79	1 µmhos/cm

Notes:

(1) Analytical methods are from *Standard Methods for the Examination of Water and Wastewater* (SM) or EPA's *Methods for Chemical Analysis of Water and Wastes* (1983).

(2) Samples to be analyzed for dissolved constituents will be field-filtered through a 0.45 µm filter.

**TABLE 3. PARAMETERS, METHODS, AND DETECTION LIMITS
FOR GROUNDWATER MONITORING**

Parameter	Analytical Method⁽¹⁾	Project-Required Detection Limit (mg/L)
Physical Parameters		
TDS	SM 2540C	10
TSS	SM 2540C	10
Common Ions		
Alkalinity	SM 2320B	4
Sulfate	300.0	1
Chloride	300.0/SM 4500CL-B	1
Fluoride	A4500-F C	0.1
Calcium	215.1/200.7	1
Magnesium	242.1/200.7	1
Sodium	273.1/200.7	1
Potassium	258.1/200.7	1
Nutrients		
Nitrate+Nitrite as N	353.2	0.01
Trace Constituents (Dissolved)⁽²⁾		
Aluminum (Al)	200.7/200.8	0.009
Antimony (Sb)	200.7/200.8	0.0005
Arsenic (As)	200.8/SM 3114B	0.001
Barium (Ba)	200.7/200.8	0.003
Beryllium (Be)	200.7/200.8	0.0008
Cadmium (Cd)	200.7/200.8	0.00003
Chromium (Cr)	200.7/200.8	0.01
Cobalt (Co)	200.7/200.8	0.01
Copper (Cu)	200.7/200.8	0.002
Iron (Fe)	200.7/200.8	0.02
Lead (Pb)	200.7/200.8	0.0003
Manganese (Mn)	200.7/200.8	0.005
Mercury (Hg)	245.2/245.1/200.8/SM 3112B	0.000005
Molybdenum (Mo)	200.7/200.8	0.002
Nickel (Ni)	200.7/200.8	0.001
Selenium (Se)	200.7/200.8/SM 3114B	0.0002
Silver (Ag)	200.7/200.8	0.0002
Strontium (Sr)	200.7/200.8	0.0002
Thallium (Tl)	200.7/200.8	0.0002
Uranium (U)	200.7/200.8	0.008
Zinc (Zn)	200.7/200.8	0.002
Field Parameters		
Water Level	HF-SOP-10	0.01 ft
Water Temperature	HF-SOP-20	0.1 °C
Dissolved Oxygen (DO)	HF-SOP-22	0.1 mg/L
pH	HF-SOP-20	0.1 s.u.
Specific Conductance (SC)	HF-SOP-79	1 µmhos/cm

Notes:

(1) Analytical methods are from *Standard Methods for the Examination of Water and Wastewater* (SM) or EPA's *Methods for Chemical Analysis of Water and Wastes* (1983).

(2) Samples to be analyzed for dissolved constituents will be field-filtered through a 0.45 µm filter.

2.0 WATER RESOURCES MONITORING

2.1 SURFACE WATER

The Project lies within the Sheep Creek drainage, a tributary of the Smith River, within the Missouri River Basin. The headwaters of Sheep Creek are located in the Little Belt Mountains at an elevation of approximately 7,600 feet. Sheep Creek discharges into the Smith River approximately 34 river miles west of its headwaters, at an elevation of approximately 4,380 feet. The project site is approximately 18 river miles upstream of the confluence with the Smith River. Sheep Creek flows in a meandering channel through a broad alluvial valley upstream of the project site and enters a constricted bedrock canyon just downstream of the site.

Primary tributaries to Sheep Creek in the immediate project area are Little Sheep Creek and Coon Creek (Figure 2). There are also two spring-fed unnamed tributaries that discharge to Sheep Creek immediately upstream and downstream of Strawberry Butte. Black Butte Creek is another tributary to Sheep Creek with its headwaters south-southwest of the project site. Black Butte Creek discharges into Sheep Creek approximately seven miles downstream of the site.

A gaging station was established at SW-1 in November 2012 to collect semi-continuous stage data on Sheep Creek, downstream of the project area. The station consists of a stilling well with a pressure transducer to monitor stream stage. Manual flow measurements and stage measurements were collected from May 2012 to November 2016 to develop a stream rating curve, including frequent measurements (approximately every two weeks) during spring runoff conditions from 2013 to 2016 (Figure 4). A logarithmic regression line was fitted to the data to establish a regression equation, or rating curve, relating stream stage to discharge. The rating curve is: $\text{Stage} = 0.4146 \cdot \ln(\text{Flow}) - 0.3865$. The stream rating curve provides a strong fit of the data, with a high coefficient of determination ($R^2 = 0.974$).

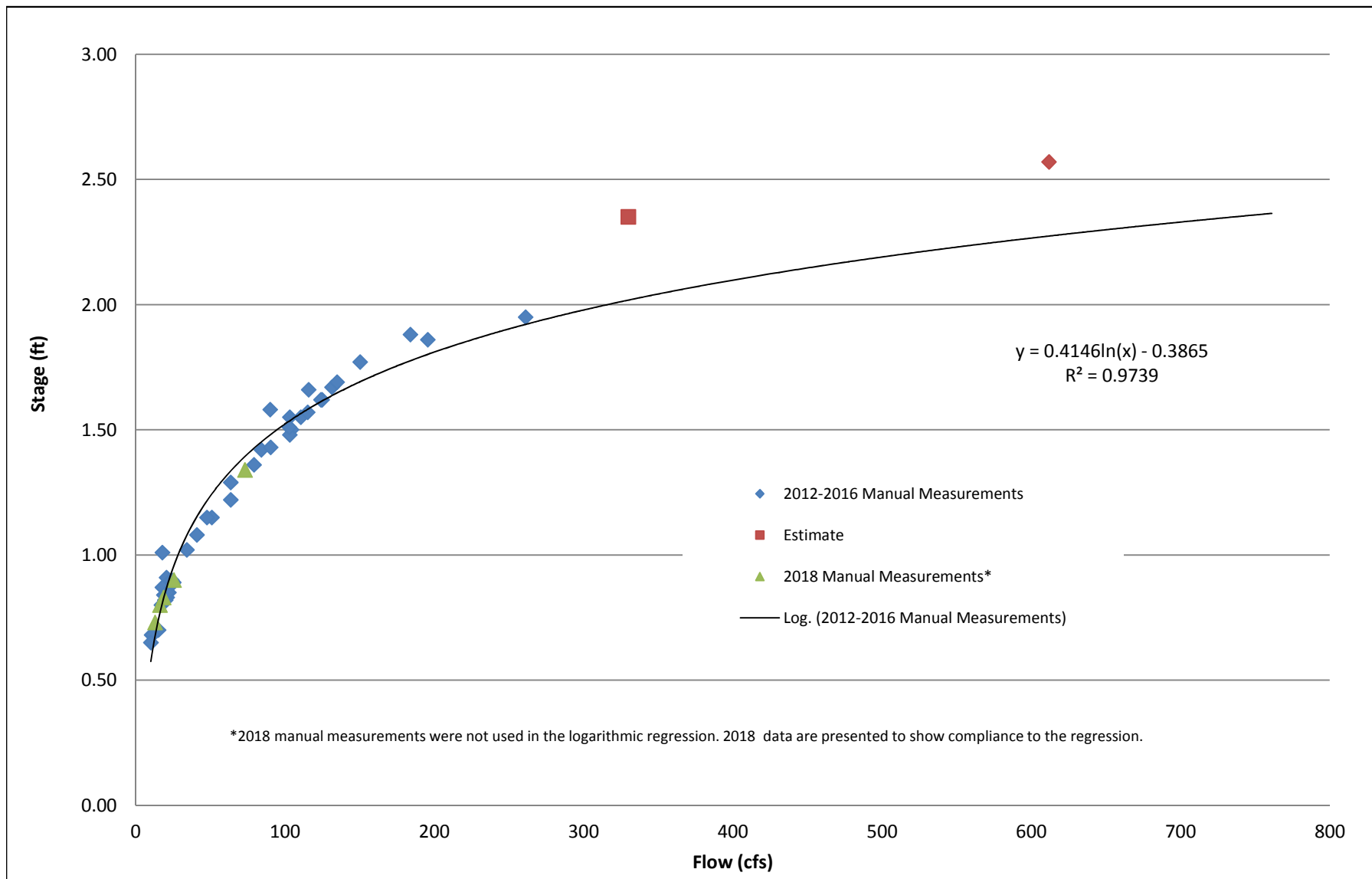


Figure 4
SW-1 Gaging Station Rating Curve
Black Butte Copper Project
Meagher County, Montana

A gaging station, consisting of a staff gage, stilling tube, and transducer, was installed on Little Sheep Creek at SW-14 in 2016. A rating curve is yet to be established for SW-14, due to insufficient amount data throughout the range of flow and stage.

Surface water monitoring was conducted in accordance with methodologies described in the FSAP, which consist of the following steps:

1. Collection of field parameters;
2. Water quality sample collection; and
3. Measurement of stream flow and stage.

The monthly surface water monitoring was conducted in accordance with the schedule described in Section 1.0 and is summarized below. Sites SW-17 and SW-18 were added to the monthly monitoring program in January 2018 to establish baseline conditions at these sites as they will be part of the operational monitoring program.

The number of sites that parameters, samples, and/or measurements were collected each month in 2018 is summarized in Table 4. As shown in Table 4, flow measurements were not conducted during winter months due to ice prohibiting accurate measurements. Similarly, during fall and winter months, several sites were dry or completely frozen which precludes the collection of field parameters, water quality samples, and flow measurements. Therefore, unless otherwise stated, the variability in amount of data collected during monitoring events is due to site conditions.

**TABLE 4. SUMMARY OF SURFACE WATER
MONITORING DATA COLLECTION**

	Number of Locations Monitored			
2018 Quarter	Month	Field Parameters	Water Quality Samples	Flow Measurements
First	January	5	5	0
	February	5	5	0
	March	7	11	0
Second	April	5	5	1
	May	6	6	4
	June	12	8	12
Third	July	6	6	6
	August	6	6	6
	September	12	8	12
Fourth	October	6	6	6
	November	7	7	1
	December	5	5	0

A review of water quality and description of apparent trends of hydrographs for these sites are provided in Section 3.1 of this report.

2.2 SPRINGS AND SEEPS

Spring and seep inventories were performed in July 2011, October 2011, and July 2012 to document and inventory existing springs and seeps within a one-mile radius of the formerly proposed exploration decline (Hydrometrics, 2012). These inventories identified ten undeveloped springs, six developed springs (for stock water) and ten seepage sites within the inventory area (Figure 2). A description of each site and locations are listed in Table 1. The sites identified as seeps are locations where there is diffuse seepage over a broad area with flow rates too low to measure at the point of discharge. The springs, in contrast, originate in a discrete area and discharge into channels at measurable flow rates. The majority of the identified sites consist of small springs or seeps located in ephemeral channels in the headwaters of small unnamed tributaries. These springs form small boggy areas with limited

flow and generally re-infiltrate within a few hundred feet downstream. A number of these springs have been developed for stock watering (indicated by a DS designation) and flow is diverted to small livestock watering tanks. Relatively large spring and seep areas were identified along the lower reaches of Coon Creek and on Little Sheep Creek and support perennial flow to lower reaches of these streams.

Three spring sites (SP-10, SP-11, and SP-12) were added to the monthly monitoring program in 2018; therefore, the monthly spring monitoring includes a total of 12 sites, 11 of which are monitored for water quality analysis. Spring SP-10 has been monitored during the annual event since 2012, however, SP-11 and SP-12 are newly discovered sites added to the monthly monitoring program in April 2018.

The spring and seep monitoring was conducted in accordance with methodologies described in the FSAP, which consist of the following steps:

- Collection of field parameters;
- Water quality sample collection; and
- Collection of flow measurements (where feasible).

The number of sites that parameters, samples, and/or measurements were collected each month in 2018 is summarized in Table 5. As shown in Table 5, flow measurements at most sites were not conducted during winter months due to dry or frozen conditions. Similarly, during these periods, field parameters and water quality were also not collected due to these conditions. Therefore, unless otherwise stated, the variability in amount of data collected during monitoring events is due to site conditions.

**TABLE 5. SUMMARY OF SPRING AND SEEP
MONITORING DATA COLLECTION**

2018 Quarter	Number of Locations Monitored			
	Month	Field Parameters	Water Quality Samples	Flow Measurements
First	January	2	2	0
	February	2	2	1
	March	2	2	0
Second	April	4	4	1
	May	10	9	9
	June	12	11	9
Third	July	12	11	9
	August	12	11	9
	September	16 ¹	10	9
Fourth	October	10	9	8
	November	9	8	6
	December	10	9	8

Note:

1. Include five seeps monitored as part of the annual program.

A review of 2018 water quality and description of apparent trends of hydrographs for spring and seep sites are provided in Section 3.2 of this report.

2.3 GROUNDWATER

The project area is underlain by dolomitic and silicic shales of the Newland Formation. A thin veneer of colluvium overlies bedrock in most upland areas, whereas, in the flanks of the major drainages, bedrock is overlain by thicker tertiary deposits. Quaternary alluvial deposits are present beneath and adjacent to the stream channels and along the axes of the major drainages.

Monitoring wells and test wells have been completed within the shallow and deep stratigraphic units in the vicinity of the proposed mine workings and facilities to characterize aquifer properties, monitor baseline water levels and groundwater quality, and evaluate

hydraulic gradient and groundwater flow direction within the project area. The well locations are shown on Figure 3 and well completion data are summarized in Table 1. A series of paired monitoring wells (MW-1A, MW-1B, MW-2A, MW-2B, MW-4A, MW-4B, MW-6A, and MW-6B) were installed between 2011 and 2013 to document and compare baseline conditions between the shallow weathered bedrock and unconsolidated colluvium and the underlying shallow bedrock groundwater systems (Hydrometrics, 2015b). Monitoring well MW-3 was completed in November 2011 near the terminus of the proposed exploration decline. Monitoring wells MW-6A, MW-6B, MW-7, and MW-8 were installed to document baseline water quality in the vicinity of the proposed central underground infiltration galleries (Hydrometrics, 2013). MW-6A is completed in shallow alluvial gravel, and MW-6B, MW-7, and MW-8 are completed in shallow dolomitic shale bedrock of the Lower Newland Formation. In 2014, MW-9 was installed above the upper sulfide zone (USZ) as a monitoring point to assess the effects of mine dewatering during development (Hydrometrics, 2015b). Four monitoring wells (MW-10, MW-11, MW-12, and MW-13) were installed in March 2016 to evaluate the shallow groundwater systems in the vicinity of the proposed Cemented Tailings Facility (CTF; Hydrometrics, 2016a). Monitoring wells MW-10, MW-11, and MW-12 are completed in granodiorite; whereas well MW-13 is completed in shale/limestone. Monitoring wells MW-14 and MW-15 were installed in dolomitic shale beneath the proposed eastern underground infiltration gallery in September 2016 (Hydrometrics, 2017). Additionally, compliance monitoring wells MW-16, MW-17, MW-18, MW-19, and MW-20 were installed in 2018 to establish baseline groundwater monitoring in the areas adjacent to proposed water-bearing/waste surface facilities (Hydrometrics, 2018).

In addition to the monitoring wells, ten test wells have been installed to provide information on the hydrologic characteristics of the geologic units within and adjacent to the proposed mine (Figure 3; Hydrometrics, 2015a). Two test wells (PW-1 and PW-2) were installed in November 2011 and two test wells (PW-3 and PW-4) were installed in March 2012 to evaluate hydrologic characteristics near the proposed and alternative locations for the mine access decline. Test wells PW-5, PW-6, and PW-7 were installed in 2013 to evaluate hydrologic characteristics of the Volcano Valley Fault (PW-5), Buttress Fault

(PW-6), and lower copper zone (PW-7). Three additional test wells were installed in 2014 to evaluate the hydrostratigraphic units overlying (PW-8), within (PW-9), and underlying (PW-10) the upper copper zone. In 2015, the screen interval of well PW-6 was abandoned and the well was further advanced and completed as an open borehole in the Neihart Formation; the new completion has been named PW-6N. The completion details for each test well are summarized in Table 1.

Twelve piezometers are used to monitor the groundwater levels in the shallow alluvium and colluvium deposits adjacent to Sheep Creek, Coon Creek, and Dry Creek. Piezometers PZ-1 through PZ-5, PZ-8, PZ-9, PZ-11R, PZ-13, PZ-14, and PZ-15 are completed in the Sheep Creek alluvial system. Paired piezometers PZ-7A and PZ-7B are located near the headwaters of Coon Creek and PZ-12 located adjacent to Coon Creek, near PW-3. PZ-10 is located in the Dry Creek drainage south of wells MW-9, PW-9, and PW-10. The completion details of each piezometer are included in Table 1.

The quarterly groundwater monitoring was conducted in accordance with the schedule described in Section 1.0 and is summarized below. Sites MW-16, MW-17, MW-18, MW-19, and MW-20 were added to the quarterly monitoring program in January 2018 to establish baseline conditions at these sites as they will be part of the operational monitoring program.

The groundwater monitoring was conducted in accordance with methodologies described in the FSAP, which consist of the following steps:

1. Measurement of SWL;
2. Well purging and monitoring for field parameter stabilization; and
3. Water quality sample collection.

In addition to the quarterly monitoring program, the five new wells (MW-16 through MW-20) were monitored in January 2018; however, the water quality sample from MW-17 was not submitted for laboratory analysis due to the excessive amount of suspended solids in the sample. Additional efforts to further develop and remove sediment from

MW-17 were completed in May 2018, when site conditions allowed access; therefore, laboratory water quality analysis of groundwater at MW-17 was not conducted in the first quarter of 2018.

Supplemental water level monitoring was conducted at the core hole SC12-116 in 2018 to augment water level data collected at monitoring wells, test wells, and piezometers and development. The location of SC12-116 is shown on potentiometric maps, described in Section 3.3. Additionally, several wells (MW-3, MW-9, PW-3, PW-4, PW-8, PW-9, and PW-10) have been instrumented with pressure transducers to monitor water levels on 4-hour intervals since 2015. The transducer data are barometrically compensated and the water level elevation is calculated based on the measuring point elevation.

3.0 RESULTS

3.1 SURFACE WATER

Surface water flows measured in 2018 at each monitoring station are summarized in Table 6. During winter months, many of the sites were partially or fully frozen or dry, which precluded flow measurements at all sites during January, February, March, and December. With the exception of SW-14, frozen or dry conditions also precluded flow measurements at all sites in April and November.

Hydrographs from the baseline monitoring (2011 to 2018) at all surface water monitoring sites are included in Appendix A1. A hydrograph from the SW-1 stream gaging station on Sheep Creek is shown on Figure 5. In general, the hydrographs for surface water sites at tributary streams exhibit similar trends to the hydrographs for Sheep Creek. With the exception of frozen conditions, the lowest flows are typically observed in the fall and peak flows are observed in the spring.

3.1.1 Stream Flow

Stream flows measured at surface water monitoring sites were within the range of previous data and are described below by water body and summarized in Table 6. Hydrographs, generated from manual flow measurements collected at each site, are provided in Appendix A1.

3.1.1.1 Sheep Creek

Flow measurements at Sheep Creek surface water monitoring sites (SW-1, SW-2, and USGS-SC1) ranged from approximately 11.6 cfs to 58.5 cfs at the upstream site (USGS-SC1) and approximately 13.0 cfs to 247.6 cfs at the downstream site (SW-1) during 2018. The flows measured at intermediate site (SW-2) ranged from 9.4 cfs to 69.0 cfs. It should be noted that the peak flow measured at SW-1 was during high runoff in May 2018 and measurements were not collected at other Sheep Creek sites in May due to unsafe access. The timing and magnitude of flows measured at Sheep Creek monitoring sites were within the previously

TABLE 6. SURFACE WATER FLOW SUMMARY 2018

Site	units	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
SW-1	cfs	NF-ICE	NF-ICE	NM-ICE	NM-ICE	247.6	73.17	25.69	16.29	13.02	18.7	NM-ICE	NM-ICE
SW-2	cfs	NF-ICE	NF-ICE	NM-ICE	NM-ICE	NM	69.04	11.73	11.8	9.43	15.68	NM-ICE	NM-ICE
SW-3	cfs	--	--	NF-ICE	NM-ICE	0.6	0.47	0.14	0.13	0.07	0.09	NM-ICE	NF-DRY
SW-4	cfs	--	--	NM-ICE	--	--	0.16	--	--	0.15	--	NM-ICE	--
SW-5	cfs	--	--	NF-DRY	--	--	NF-DRY	--	--	NF-DRY	--	NM-DRY	--
SW-6	cfs	--	--	NM-ICE	--	--	0.53	--	--	0.15	--	NM-ICE	--
SW-8	cfs	--	--	NM-ICE	--	--	1.82	--	--	0.25	--	NM-ICE	--
SW-9	cfs	--	--	NM-ICE	--	--	3.39	--	--	0.52	--	NM-ICE	--
SW-10	cfs	--	--	NM-ICE	--	--	1.57	--	--	0.25	--	NM-ICE	--
SW-11	cfs	--	--	NM-ICE	--	--	3.71	--	--	0.53	--	NM-ICE	--
SW-14	cfs	NF-ICE	NF-ICE	NM-ICE	0.29	9.19	6.59	2.25	1.09	0.79	0.66	0.88	NM-ICE
SW-17	cfs	NF-ICE	NF-ICE	NM-ICE	NM-ICE	1.8	0.3	0.25	0.11	0.19	0.19	NM-ICE	NM-ICE
SW-18	cfs	NF-DRY	NF-DRY	NF-DRY	NF-DRY	NM	NF-DRY	NF-DRY	NF-DRY	--	NF-DRY	NM-DRY	NF-DRY
USGS-SC1	cfs	NF-ICE	NF-ICE	NM-ICE	NM-ICE	NM	58.47	30.14	18.61	16.02	11.62	NM-ICE	NM-ICE

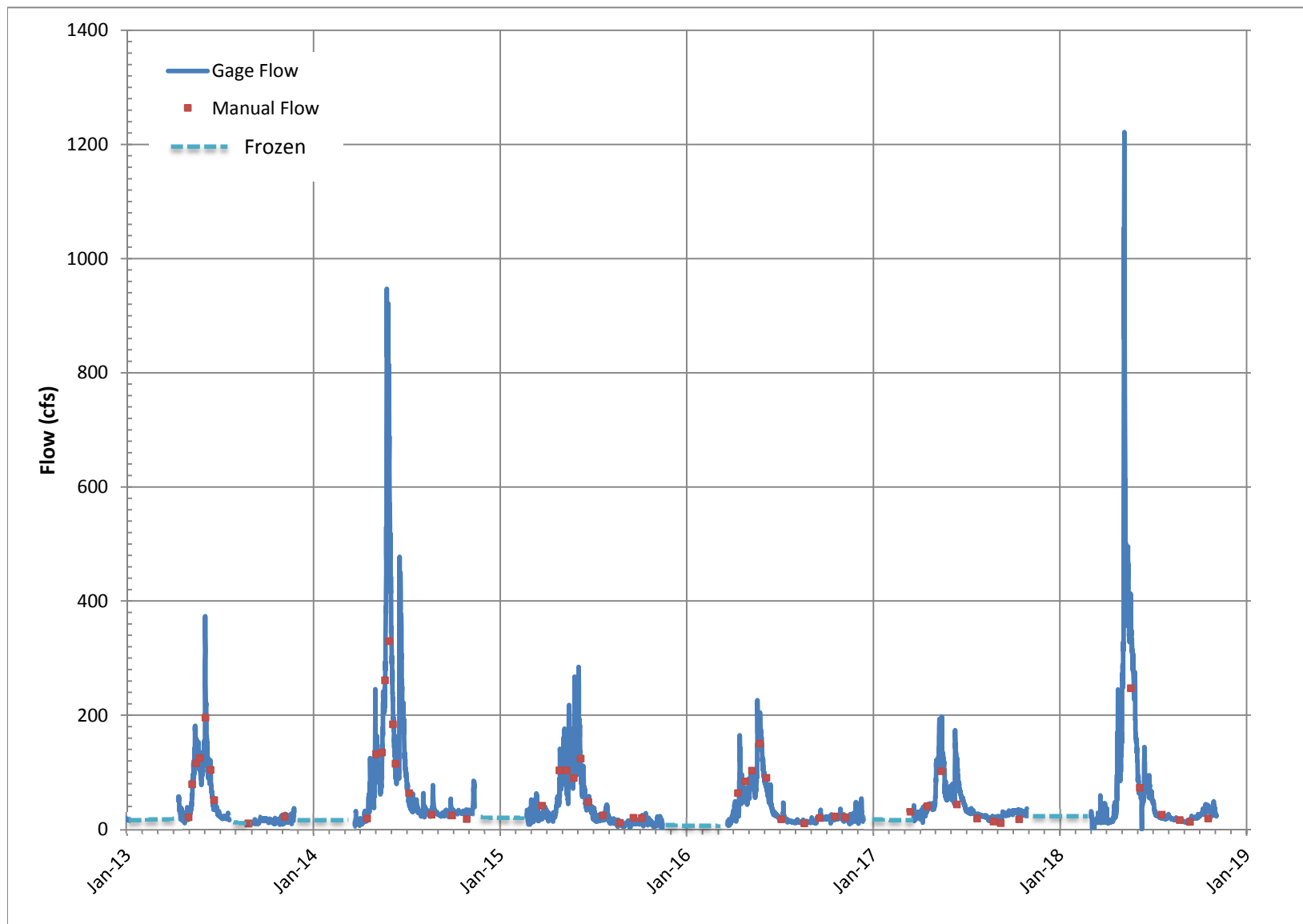
All values are reported in cubic feet per second unless otherwise noted

NM: Not Measured

NM-ICE: Not Measured, Ice Prohibitive

NF-ICE: Not Flowing, Ice on ground

NF-DRY: Not Flowing, Dry ground



Hydrometrics, Inc.
Consulting Scientists and Engineers

Figure 5
SW-1 Hydrograph
Black Butte Copper Project
Meagher County, Montana

observed range and period as shown by the hydrographs in Appendix A1. The highest observed flows measured at SW-2 and USGS-SC1 in 2018 were among the lowest observed spring runoff flows during the baseline monitoring period.

Due to the presence and abundance of ice in the Sheep Creek channel prior to monitoring in May, manual measurements were not collected prior to peak runoff, as shown by the SW-1 gaging station hydrograph on Figure 5. The manual flow measurements were consistent with the gaging station and rating curve data and are within measurement error. The gaging station hydrograph (Figure 5) indicates the peak flow occurred on May 11, 2018 at approximately 1,220 cfs. Despite the SW-1 rating curve not being validated by manual measurements at this magnitude of flow, the peak flow at SW-1 occurred at the same time as peak flow at the Smith River USGS gaging station, below Sheep Creek near Fort Logan (06077200).

3.1.1.2 Little Sheep Creek

Flow measurements at Little Sheep Creek surface water monitoring sites SW-8 (upstream) and SW-14 (downstream) ranged from 0.25 cfs at SW-8 in September to 9.2 cfs at SW-14 in May. The timing and magnitude of flows measured at Little Sheep Creek sites in 2018 were within the range of previously observed values. The increase in flow at SW-14 is from tributary and groundwater contributions between upstream and downstream sites (Appendix A1).

3.1.1.3 Coon Creek

Flow measurements at Coon Creek surface water monitoring sites (SW-3, SW-4, SW-17, and SW-18) ranged from 0.1 cfs at SW-3 in September and October to 1.8 cfs at SW-17 in May. Flow measurements at SW-4 were approximately 0.15 cfs during June and September and measurements at SW-18 were not collected due to dry conditions. The flows measured at Coon Creek sites in 2018 were within the range previously observed. The hydrographs in Appendix A1 exhibit an increase in flow along Coon Creek, suggesting an influx of groundwater, which is consistent with previous synoptic monitoring results (Hydrometrics, 2015a).

3.1.1.4 Brush Creek

Flow measurements at the Brush Creek surface water monitoring site (SW-6) ranged from 0.5 cfs in June to 0.15 cfs in September. The magnitude of peak flow measured in 2018 was an increase from the previous three years, though within the range of baseline data.

3.1.1.5 Black Butte Creek

Flow measurements at Black Butte Creek surface water monitoring sites (SW-9, SW-10, and SW-11) ranged from 0.25 cfs at SW-10 in September to 3.7 cfs at SW-11 in June. Flow measurements at SW-9 ranged from 0.5 cfs to 3.4 cfs in June and September, respectively. Monitoring was not conducted at the unnamed tributary to Black Butte Creek (SW-5) due to dry conditions. The flows measured during 2018 were within the range previously observed. The hydrographs in Appendix A1 exhibit overall increasing flows with downstream distance along Black Butte Creek.

3.1.2 Surface Water Quality

Surface water quality data for 2018 and trend graphs of physical parameters (field pH, TDS, alkalinity, and dissolved oxygen (DO)), total nitrogen, and metals (total recoverable arsenic, strontium, and dissolved aluminum) concentrations are included in Appendix B. Surface water quality during 2018 was similar at all of the surface water monitoring sites, which are characterized by the following:

- Calcium bicarbonate type water;
- Moderately hard to hard water;
- Near neutral to alkaline pH (6.6 s.u. to 8.63 s.u.);
- Low nutrient concentrations (<0.04 mg/L to 0.6 mg/L total nitrogen);
- Low total dissolved solids (TDS) (115 to 299 mg/L); and
- Low level detection of metals at one or more sites, including: arsenic, barium, cadmium, iron, lead, manganese, mercury, nickel, selenium, strontium, thallium, uranium, zinc, and dissolved aluminum (Appendix B).

The concentration of iron at SW-6 during June (3.04 mg/L) exceeded the 1.0 mg/L chronic Aquatic Life Standard (DEQ, 2017). There were no other water quality standard exceedances at surface water sites during 2018.

As noted above, the water quality observed during 2018 were consistent with previous results. Reviews of trend graphs throughout the baseline monitoring period are summarized below by surface water body. Overall, the trends for arsenic and dissolved aluminum indicate infrequent low-level detection at concentrations near or below the detection throughout most of the year, with occasional detection of elevated concentrations during spring runoff. It should be noted that occasional low field pH values recorded during winter months are likely affected by low (near freezing) water temperatures.

3.1.2.1 Sheep Creek

The trend graphs for surface water monitoring sites SW-1, SW-2, and USGS-SC1 exhibit overall stable trends with evident seasonal variation. The pH measured at these sites indicates a wide range of values, from acidic (5.30 s.u.) to alkaline (8.71 s.u.) throughout the baseline monitoring period. The trend graphs exhibit moderate to relatively high DO concentrations (7 mg/L to 16.6 mg/L) at all Sheep Creek monitoring sites with occasionally lower concentrations (down to 4 mg/L at SW-1) during winter months. The concentrations of TDS, alkalinity and strontium temporarily decrease during spring runoff. However, the concentration of dissolved aluminum periodically increases (up to 0.33 mg/L) above the chronic aquatic life standard (0.087 mg/L) during spring monitoring. Additionally, the trend graphs for total nitrogen exhibit periodic increases of up to 1.39 mg/L (SW-2) during spring and winter which are likely due to increases in concentrations of organic nitrogen or ammonia; the concentrations of total nitrogen is an order of magnitude greater than nitrate+nitrite during these periods. The elevated total nitrogen concentrations during spring are likely due to surface runoff from agricultural fields, whereas elevated concentrations during the winter may be due to the release and oxidation of ammonia from decomposition of organic matter.

3.1.2.2 Little Sheep Creek

The trend graphs for surface water monitoring site SW-14 exhibit overall stable trends for all constituents with no indication of seasonal variation. With the exception of one measurement in December 2016 (pH 6.07 s.u.), which appeared to be impacted by water temperature, the monitoring at SW-14 indicates near neutral (7.36 s.u.) to alkaline (8.48 s.u.) pH throughout the baseline monitoring period. The concentrations of TDS, alkalinity and strontium occasionally decrease during spring runoff. The concentration of dissolved aluminum is typically near or below the detection limit (0.009 mg/L); however, during March and April 2017, the dissolved aluminum concentration at SW-14 increased to approximately 0.05 mg/L. Similar to Sheep Creek, the total nitrogen concentration at SW-14 increased during December 2017 to a maximum value of 1.25 mg/L; the elevated concentrations during the winter may be due to the release of ammonia nitrogen from decomposition of organic matter.

3.1.2.3 Coon Creek

The trend graphs for surface water monitoring sites SW-3 and SW-17 exhibit overall stable trends with minor seasonal variation. The field pH measurements indicate alkaline pH (7.92 s.u. to 8.70 s.u.) throughout the baseline monitoring period. The TDS, alkalinity, and strontium trends are stable; however, minor decreases in concentration are observed during spring runoff. The concentration of dissolved aluminum typically remains near or below the detection limit at both sites, however, during May 2011 and August 2012, the concentration of dissolved aluminum at SW-3 increased to 0.07 mg/L and 0.11 mg/L, respectively; the concentration of dissolved aluminum at SW-17 increased to 0.016 during May 2018. The trend graphs for total nitrogen exhibit a typical range of concentrations between 0.04 mg/L to 0.34 mg/L, however, the concentration increased to 0.6 mg/L in June 2018. The elevated total nitrogen concentrations during spring are likely due to surface runoff from agricultural fields.

3.1.2.4 Brush Creek

The trend graphs for surface water monitoring site SW-6 indicates stable trends of all constituents. The field pH measurements indicate a range of near neutral to alkaline pH

(6.67 s.u. to 8.68 s.u.) throughout the baseline monitoring period. With the exception of August 2012, the trend graph of dissolved aluminum exhibits concentrations near or below the detection limit for the baseline period; similar to Coon Creek, the concentration of dissolved aluminum in Brush Creek during August 2012 increased to 0.15 mg/L, exceeding the chronic aquatic life standard (0.087 mg/L). The total nitrogen concentration, as exhibited in the trend graph, ranges from 0.1 mg/L to 0.45 mg/L, with highest concentration observed during spring and fall months.

3.1.2.5 Black Butte Creek and Unnamed Tributary to Black Butte Creek

The trend graphs for surface water monitoring site SW-11 on Black Butte Creek indicate stable trends for physical parameters (field pH, TDS, alkalinity, and DO), total nitrogen and strontium. The field pH measurements indicate a range of near neutral to alkaline pH (7.29 s.u. to 8.69 s.u.) throughout the baseline monitoring period. The trend graph for arsenic exhibits concentrations at or below the detection limit during the baseline monitoring. The trend graph for dissolved aluminum exhibits overall low stable concentrations. However, during spring runoff, the concentration of dissolved aluminum in Black Butte Creek typically exceeds the chronic aquatic life standard (0.087 mg/L); the greatest concentrations observed during the baseline monitoring were during March (0.385 mg/L) and June (1.36 mg/L) 2017. The trend graphs of TDS, alkalinity, and strontium exhibit minor decreases in concentration during spring runoff.

Due to the ephemeral nature of the unnamed tributary, water at SW-5 is typically observed only during high spring runoff; therefore, evaluation of seasonal trends is not possible and for this reason, trend graphs are not included in Appendix C. Throughout the baseline monitoring period, five water quality samples have been collected from SW-5 (2011, 2012, 2013, 2015, and 2017) during spring monitoring events. The data suggest physical parameters are generally stable and the dissolved aluminum concentrations vary significantly from 0.19 mg/L in 2012 to 3.09 mg/L in 2017. The high dissolved aluminum concentration during March 2017 was coincident with high total suspended solids (107 mg/L) concentrations and high concentrations of total recoverable copper (0.009 mg/L), iron (6.0 mg/L), lead (0.0047 mg/L), and manganese (0.165 mg/L), slightly alkaline pH (7.63 s.u.),

and low alkalinity (25 mg/L). Samples were not collected from SW-5 during 2014, 2016, and 2018 due to dry conditions.

3.2 SPRINGS AND SEEPS

The flow measurements and water quality data from springs and seeps monitored during 2018 are consistent with previous monitoring and summarized below and presented in Appendix A1 (flow) and Appendix C (water quality). During winter months, many of the springs were fully frozen or dry, which precluded flow measurements and sample collection from most sites during January through April and November through December.

3.2.1 Spring Flow

Hydrographs from the baseline monitoring (2011 to 2018) at spring monitoring sites are included in Appendix A1. In general, the hydrographs for spring sites exhibit similar timing of peak flow to the surface water monitoring sites. With the exception of frozen conditions, the lowest flows are typically observed in the fall and peak flows are observed in the spring. The flow rates were not measured at SP-11 and SP-12 in 2018 due to the flow not being within a discernable channel and unsafe access, respectively.

During January through April of 2018, flow measurements were only collected from SP-7 due to frozen or dry conditions at other springs. The flows at SP-7 were consistent with previous data, ranging from 11.2 gpm to 15.3 gpm. Flow measurements collected from several springs during May 2018 were the greatest observed throughout the period of record at the following sites: DS-1 (62.3 gpm), DS-2 (9.4 gpm), DS-3 (159 gpm), SP-4 (50.3 gpm), SP-6 (3.2 gpm), and SP-10 (59.7 gpm). Additionally, the flow measured at SP-7 in July (136 gpm) was the highest flow rate measured at any spring monitoring site to date. In contrast, the flow at DS-4 was too low to measure (<0.1 gpm) in May, June, and July. With the exceptions noted above, the flows measured at springs in 2018 were consistent with previously observed ranges. Beginning in September, several springs stopped flowing, marked by dry conditions in the fall (SP-2, DS-2, DS-3, DS-4, DS-5, and DS-6) and frozen conditions at many sites during the winter. Springs SP-4 (0.58 gpm) and SP-7 (15.3 gpm) were the only flowing springs in December.

3.2.2 Spring Water Quality

The spring water quality data from the 2018 baseline water resource monitoring are compiled in Appendix C along with trend graphs of physical parameters (field pH, TDS, alkalinity, and), nitrate+nitrite, and metals (arsenic, iron, strontium, and thallium) concentrations.

Water quality at springs and seeps during 2018 was within the ranges of previous monitoring data and similar to the wells completed in shallow alluvium and weathered bedrock. The water quality at springs and seeps during 2018 are characterized by the following:

- Calcium bicarbonate type water;
- Moderately hard to hard water;
- Acidic to alkaline pH (5.71 s.u. to 8.16 s.u);
- Low to moderate TDS concentrations (53 mg/L to 264 mg/L); and
- Low level detection of metals, including: dissolved aluminum, arsenic, barium, copper, iron, manganese, mercury, nickel, selenium, strontium, thallium, uranium, and zinc (Appendix C).

Trace constituents were all below groundwater human health standards, with most constituents being near or below the detection limit. Field parameters and analytical water quality results from the 2018 spring and seep monitoring are included in Appendix C.

With the exception of iron at SP-3, DS-3, and DS-4, the trend plots in Appendix C indicate overall stable and low concentrations of dissolved arsenic, iron, strontium, and thallium, with concentrations commonly below the detection limit. The trend plots of iron and TDS concentration at SP-3, DS-3, and DS-4 exhibit seasonal trends of elevated concentration during spring runoff as shown by the hydrographs in Appendix A1. The trend plots also indicate that increases in arsenic concentrations are contemporaneous with elevated iron concentrations at these sites during spring monitoring periods. In contrast, the trend plot for strontium at SP-3 exhibits the highest concentrations (0.07 mg/L to 0.1 mg/L) during summer and fall monitoring periods. The nitrate+nitrite concentration at all springs remain below 0.7 mg/L during the monitoring period.

3.3 GROUNDWATER

The number of sites that parameters, samples, and/or water level measurements were collected each quarter of 2018 is summarized in Table 7. Water quality monitoring was not conducted at monitoring well SC15-184 or MW-17 in March due to frozen conditions (at SC15-184) and ongoing well development efforts (at MW-17). The core hole SC12-116 and test well PW-6N were not locatable in March 2018 due to concealment by the snow pack and therefore water level measurements were not collected. Water quality samples and field parameter measurements were not collected from the test wells during the first and fourth quarter monitoring events due to snow pack and frozen ground conditions. Additionally, water quality samples, field parameter measurements, and SWL measurements were not collected from wells MW-14 and MW-15 due to the remaining dye in the wells from the Eastern UIG tracer study. Water quality monitoring was not conducted at test well PW-7 in June or September due to malfunctions with the dedicated pump system. However, the pump system was repaired and water quality monitoring at PW-7 was conducted in October.

**TABLE 7. SUMMARY OF GROUNDWATER
MONITORING DATA COLLECTION**

2018 Quarter	Number of Locations Monitored					
	Month	Field Parameters	Water Quality Samples	SWL Measurements		
				Monitoring Wells	Test Wells	Piezometers
First	January	5	4	5	--	--
	February	--	--	--	--	--
	March	23	23	24	8	12
Second	April	--	--	--	--	--
	May	--	--	--	--	--
	June	31	31	27	9	15
Third	July	--	--	--	--	--
	August	--	--	--	--	--
	September	31	31	27	9	14
Fourth	October	1	1	--	--	--
	November	25	25	26	9	14
	December	--	--	--	--	--

3.3.1 Groundwater levels

Groundwater levels measured during 2018 were consistent with previous data collected. A summary of water level elevation data collected quarterly during 2018 and hydrographs of baseline monitoring water level data provided in Appendix A2. Groundwater elevations calculated for each well and piezometer were used to construct quarterly potentiometric surface maps shown on Figures 6A through 6D. The baseline potentiometric data are consistent with the earlier Cominco interpretations (Chen-Northern, 1989) and show that the overall groundwater flow direction in the bedrock is generally towards Sheep Creek, with an eastward flow direction in the vicinity of the Johnny Lee Deposit and a northeastern direction in the area between Coon Creek and Brush Creek (Figures 6A through 6D). The potentiometric maps indicate the hydraulic gradient is stable seasonally and consistent with previous results, ranging from 0.07 to 0.08 in the vicinity of the Upper Johnny Lee Deposit; measured near wells MW-3 and PW-4; and a slightly lesser gradient (0.04) in the area north of MW-8. Within the alluvial system, the gradient is relatively low, ranging from 0.005 to 0.009.

Vertical hydraulic gradients were evaluated in the areas where there are paired wells and triplicate wells as shown on Figures 6A through Figure 6D. The vertical gradients calculated from water level data during 2018 are in Table 8, and are seasonally consistent. There is a strong downward gradient at paired wells MW-1A/MW-1B and PW-4/PW-8 which are located near the eastern edge of the Upper Johnny Lee Deposit (Table 8), averaging -0.26 and -0.15, respectively. Water levels at other areas within the deposit area indicate relatively weak upward gradients (averages of 0.021 and 0.031) shown by well pairs MW-2A/-2B and MW-9/PW-9, located in the southern and central portion of the deposit, respectively. Well pair MW-6A/-6B are shallow wells completed near Brush Creek and show a consistently small head differential and a non-discernable vertical gradient (<0.01) throughout the year. Well pair MW-4A/MW-4B is completed in the Sheep Creek alluvial system and underlying bedrock, respectively. These wells show a weak upward gradient (0.015) between the bedrock system and alluvial system. There is one triplicate well set (MW-9, PW-9, and PW-10). As described above, the vertical gradients between MW-9/PW-9 show a relatively

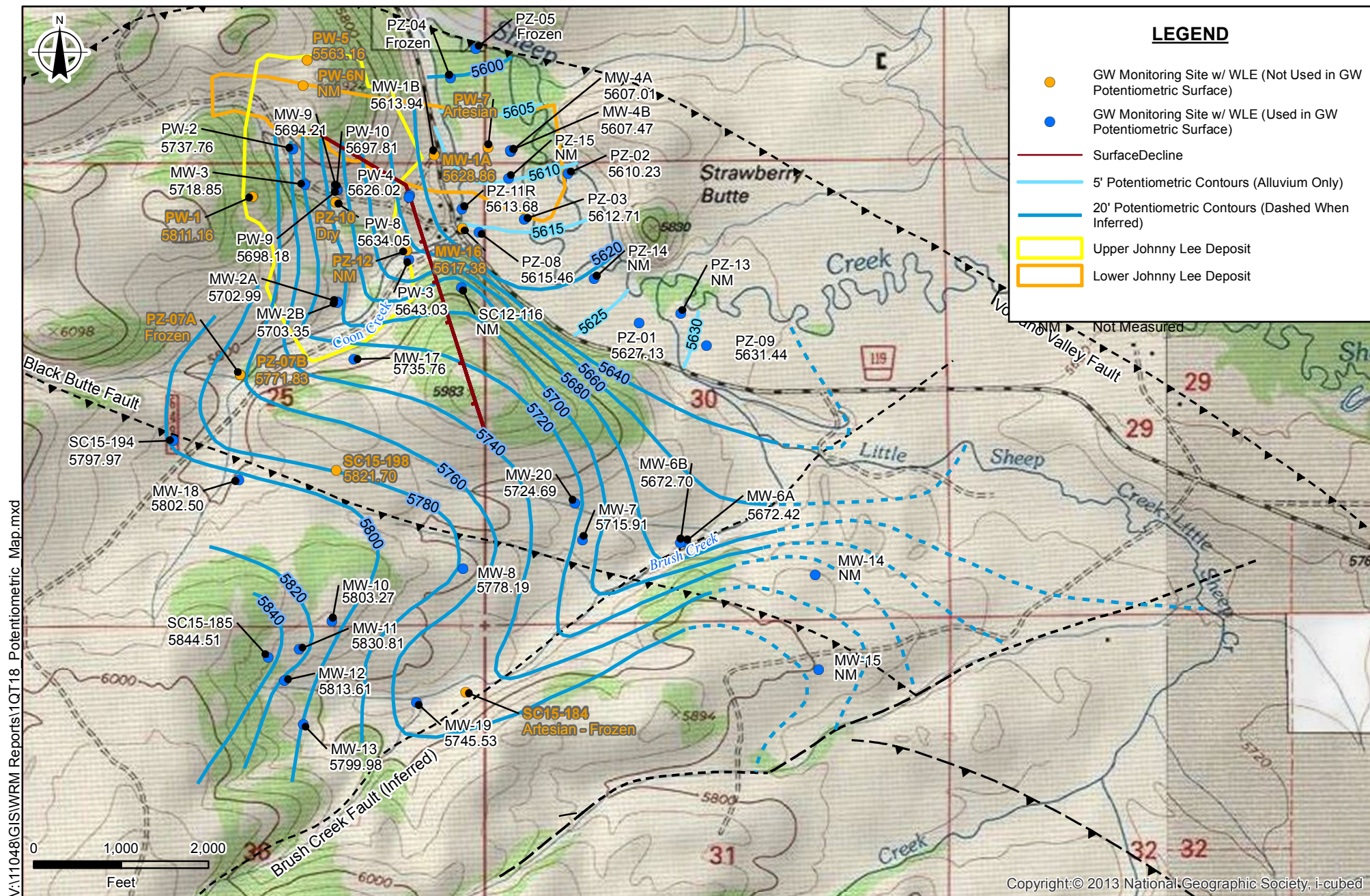
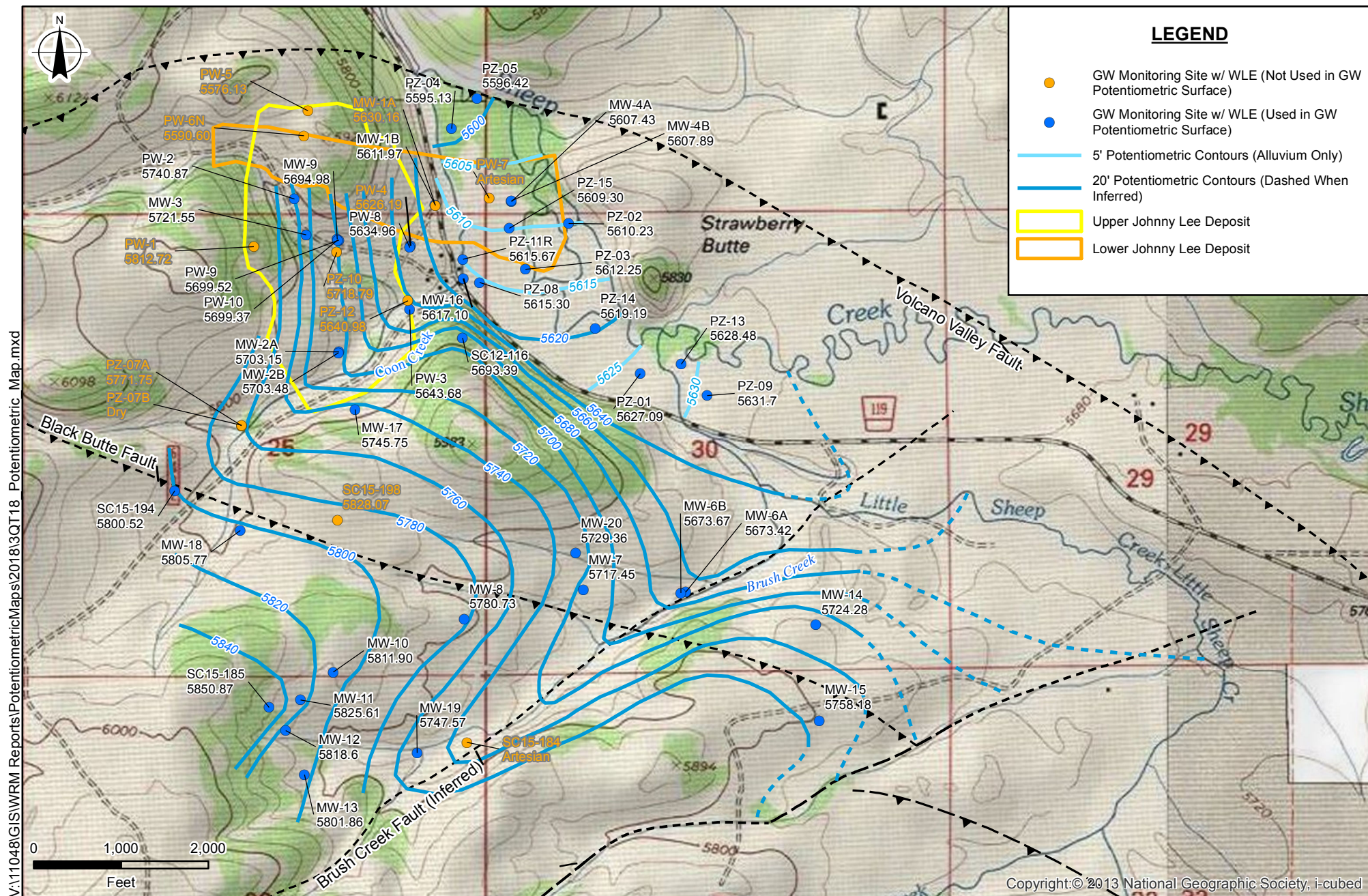


Figure 6A
2018 March Potentiometric Surface Map
Black Butte Copper Project
Meagher County, Montana

V:\11048\GIS\WORM Reports\1QT18 Potentiometric Map.mxd



weak upward gradient between the UCZ (PW-9) and the overlying lower Newland Formation (YNL-A) (MW-9). In contrast, the water levels at PW-9 and PW-10 (completed in the underlying lower Newland Formation; YNL-B) exhibited small head differentials and non-discernable gradients during the first three quarters of 2018. However, in November the head differential increased to approximately 1.8 feet, producing a weak upward gradient of 0.017.

TABLE 8. SUMMARY OF VERTICAL HYDRAULIC GRADIENTS

Shallow Well	Deep Well	Location	Mar-2018	Jun-2018	Sept-2018	Nov-2018
			Head Differential (ft); Vertical Gradient (ft/ft) ¹			
MW-1A	MW-1B	Eastern edge of the Upper Johnny Lee Deposit	14.92 -0.235	18.21 -0.287	18.19 -0.286	15.6 -0.246
MW-2A	MW-2B	Southern portion of the Upper Johnny Lee Deposit	0.36 0.020	0.51 0.028	0.33 0.018	0.34 0.019
MW-4A	MW-4B	Sheep Creek alluvial valley	0.46 0.015	0.44 0.014	0.46 0.015	0.46 0.015
MW-6A	MW-6B	Near Brush Creek	0.28 <0.01	0.26 <0.01	0.25 <0.01	0.25 <0.01
PW-8	PW-4	Eastern edge of the Upper Johnny Lee Deposit	8.03 -0.133	9.95 -0.164	8.77 -0.145	8.56 -0.141
MW-9	PW-9	Central area of the Upper Johnny Lee Deposit	3.97 0.034	3.02 0.026	4.54 0.038	3.01 0.025
PW-9	PW-10	Central area of the Upper Johnny Lee Deposit	0.37 <0.01	0.30 <0.01	0.15 <0.01	1.79 0.017

Note:

1. Negative values are downward gradient; positive values are upward gradient; gradients <0.01 are considered non-discernable.

Overall, the water levels measured during 2018 are consistent with prior baseline monitoring data. The water levels exhibit seasonal variation up to approximately 20 feet (MW-10), with the highest groundwater elevation typically occurring in the spring and the lowest groundwater elevation occurring in the fall or late winter. Hydrographs for the monitoring and test wells are grouped by their general location within the northern and southern areas of

operating permit boundary as included in Appendix A2. Additionally, transducers were installed in seven wells (MW-3, MW-9, PW-3, PW-4, PW-8, PW-9, and PW-10) in 2015 to monitor seasonal and long-term water level trends. The hydrographs for these wells, including manual measurements and transducer data (collected on 4-hour intervals) are also provided in Appendix A2. These hydrographs exhibit groundwater level variation within and adjacent to the Johnny Lee Deposit and indicate a maximum water level variation of up to approximately 9 feet (PW-8). The hydrographs indicate groundwater recharge is first recognized at the wells between March and peak water levels occurred during April in 2018. The highest water levels recorded by transducers were observed in 2018. At many of these wells, pumping during water quality monitoring causes short-term effect on water levels, attributed to aquifers response to pumping (drawdown and recovery of the wells).

3.3.2 Groundwater Quality

The groundwater quality data from the 2018 baseline water resource monitoring are compiled in Appendix D along with trend graphs of physical parameters (field pH, TDS, and alkalinity), nitrate+nitrite, and dissolved metals (arsenic, iron, strontium, and thallium) concentrations. Groundwater quality showed some differences related to well depths and completion zones; brief descriptions of water quality are summarized below based on groups of wells sharing similar completion and water quality results. Wells MW-14 and MW-15 were not sampled during 2018 because of high concentrations of rhodamine dye remaining in the wells after the Eastern UIG tracer study. The high concentrations of rhodamine dye preclude laboratory analysis.

The groundwater Human Health Standards (DEQ, 2017) for dissolved arsenic (0.01 mg/L), strontium (4 mg/L) and thallium (0.002 mg/L) were exceeded at several monitoring/test wells throughout 2018. A summary of the observed concentrations for these metals, associated with the exceedances, is provided in Table 9.

TABLE 9. GROUNDWATER HUMAN HEALTH STANDARD EXCEEDANCES

Site	Date	Sample ID	Arsenic (DIS) mg/L	Strontium (DIS) mg/L	Thallium (DIS) mg/L
MW-1B	3/21/18 14:05	BBC-1803-220	0.056	--	0.0134
MW-1B	6/11/18 19:35	BBC-1806-205	0.059	--	0.0154
MW-1B	9/19/18 12:10	BBC-1809-208	0.068	--	0.0118
MW-1B	11/13/18 16:40	BBC-1811-206	0.071	--	0.0125
MW-2B	3/20/18 09:40	BBC-1803-203	--	--	0.0038
MW-2B	6/11/18 17:35	BBC-1806-203	--	--	0.0038
MW-2B	9/19/18 18:05	BBC-1809-212	--	--	0.0036
MW-2B	9/19/18 18:15	BBC-1809-213	--	--	0.0037
MW-2B	11/13/18 14:50	BBC-1811-204	--	--	0.0036
MW-3	3/19/18 15:45	BBC-1803-200	0.08	13.4	--
MW-3	6/11/18 13:40	BBC-1806-200	0.069	13.2	--
MW-3	9/20/18 10:20	BBC-1809-218	0.067	13.1	--
MW-3	11/13/18 11:10	BBC-1811-201	0.074	12.6	--
MW-9	3/19/18 17:20	BBC-1803-201	0.014	--	0.0037
MW-9	6/11/18 15:50	BBC-1806-201	0.015	--	0.0045
MW-9	9/20/18 12:35	BBC-1809-219	0.012	--	0.0035
MW-9	11/13/18 12:55	BBC-1811-202	0.013	--	0.0036
PW-4	6/13/18 20:25	BBC-1806-219	0.085	10.4	--
PW-4	9/19/18 13:05	BBC-1809-207	0.071	9.93	--
PW-7	10/3/18 14:30	BBC-1810-200	--	--	--
PW-8	6/13/18 17:05	BBC-1806-218	0.014	--	0.0028
PW-8	9/18/18 18:00	BBC-1809-205	0.013	--	0.0026
PW-9	6/13/18 14:45	BBC-1806-214	0.085	9.44	--
PW-9	9/18/18 15:55	BBC-1809-204	0.087	9.03	--
PW-10	6/13/18 11:10	BBC-1806-212	0.065	13.1	--
PW-10	9/18/18 13:05	BBC-1809-203	0.063	12.8	--

The wells MW-1A, MW-2A, MW-4A, and MW-6A are completed in the shallow highly weathered bedrock or unconsolidated overburden and exhibited the following water quality characteristics during 2018:

- Calcium bicarbonate type water;
- Near neutral to slightly alkaline pH (6.98 to 7.64 s.u.);
- Low sulfate concentrations (11 to 21 mg/L);
- Moderate TDS concentrations (189 mg/L to 311 mg/L); and
- Low concentrations of many dissolved metals during one or more monitoring events, including: barium, iron, strontium, and uranium at all wells; aluminum, copper, iron, lead, manganese, selenium, thallium, and zinc at MW-1A; iron, lead, selenium, and thallium at MW-2A; iron and manganese at MW-4A; and nickel, selenium, and zinc at MW-6A (Appendix D).

3.3.2.1 Wells Completed in Shallow Weathered Bedrock/Overburden

The trend graphs in Appendix D exhibit overall stable concentrations at all wells with minor seasonal variation shown by TDS and alkalinity. The concentrations of TDS and alkalinity (160 mg/L at MW-1A to 290 mg/L at MW-4A) intermittently decrease during spring and fall monitoring periods. The pH measured at these sites throughout the baseline monitoring period indicates a range of values from slightly acidic (6.24 s.u.) to slightly alkaline (7.76 s.u.). The trend graphs exhibit low nitrate+nitrite concentrations (< 1.0 mg/L) with no apparent seasonality. With the exception of a few anomalies at MW-1A (arsenic, iron, and thallium), MW-2A (thallium) and MW-6A (iron), the trend graphs for dissolved metals exhibit stable low concentrations at all wells; the elevated concentrations of arsenic, iron, and thallium at MW-1A in 2012 and thallium in 2017 and 2018 are likely due to high turbidity observed during monitoring and may reflect breakthrough of colloidal particles through filters. These concentrations of arsenic at MW-1A and thallium at MW-1A and MW-2A exceed the groundwater human health standards (DEQ, 2017).

3.3.2.2 Wells Complete in YNL-A

Wells completed above the USZ in YNL-A include; MW-2B, MW-4B, MW-6B, MW-7, MW-8, MW-13, MW-16, MW-17, MW-18, MW-19, MW-20, and PW-3. The water quality at these wells during 2018 is characterized by the following:

- Calcium-magnesium bicarbonate type water;
- Near neutral to slightly alkaline pH (7.16 to 8.08 s.u.) and slightly acidic pH at MW-13 (6.26 s.u.) during June;
- Low to moderate sulfate concentrations (5 to 151 mg/L);
- Moderate TDS concentrations (161 mg/L to 492 mg/L); and
- Low concentrations of numerous dissolved metals during one or more monitoring events, including: aluminum, arsenic, barium, cadmium, iron, lead, manganese, molybdenum, nickel, selenium, strontium, thallium, and zinc (Appendix D).

The trend graphs (Appendix D) exhibit overall stable concentrations at all wells with minor seasonal variation shown by TDS and alkalinity. The concentrations of TDS and alkalinity intermittently decrease during spring and fall monitoring periods. The pH measured at these sites throughout the baseline monitoring period indicates a range of values from slightly acidic (6.26 s.u.) to alkaline (8.08 s.u.). The trend graphs exhibit low nitrate+nitrite concentrations (0.5 mg/L or less) near or below the detection limit. With the exception of a few anomalies at MW-2B (arsenic and iron), the trend graphs for dissolved metals exhibit stable low concentrations at all wells; the elevated concentrations of arsenic and iron in 2013 are likely due to high turbidity observed during monitoring and may reflect breakthrough of colloidal particles through filters. The concentrations of arsenic at MW-2B during March 2013 and thallium at MW-2B during all monitoring events (with the exception of the anomalously low value during March 2017) have exceeded the groundwater human health standards (DEQ, 2017).

3.3.2.3 Wells Completed in or near the Upper Sulfide Zone (USZ)

The monitoring wells MW-1B, MW-3, MW-9, PW-2, PW-4, PW-8, and PW-9 are completed within or near the USZ and exhibited the following water quality characteristics during 2018:

- Calcium-magnesium bicarbonate-sulfate type water;
- Slightly acidic to near neutral pH (6.31 to 7.48 s.u.);
- Moderate to high sulfate (54 to 246 mg/L) concentrations;
- Elevated TDS concentrations (319 to 598 mg/L); and
- Low concentrations of numerous dissolved metals during one or more monitoring events, including: aluminum, antimony, arsenic, barium cobalt, iron, lead, manganese, nickel, strontium, thallium, uranium, and zinc.
- Similar to previous results, the concentrations of iron at MW-1B (17.7 mg/L to 20.4 mg/L) and PW-4 (9.69 mg/L to 10.3 mg/L) were elevated in comparison to the concentrations at other wells, which ranged from 0.83 mg/L to 3.09 mg/L (Appendix D).

The trend graphs (Appendix D) exhibit overall stable concentrations at all wells without apparent seasonal trends. The pH measured at these sites throughout the baseline monitoring period indicates a range values from slightly acidic (6.02 s.u.) to alkaline (7.48 s.u.). The trend graphs exhibit low nitrate+nitrite concentrations (0.5 mg/L or less) near or below the detection limit. The trend graphs for dissolved metals exhibit generally stable low concentrations at all wells. The concentrations of arsenic at wells MW-1B, MW-3, MW-9, PW-4, PW-8, PW-9, strontium at wells MW-3, PW-4, PW-9, and thallium at wells MW-1B, MW-9, PW-8 have exceeded the groundwater human health standards (DEQ, 2017) throughout the baseline monitoring period.

3.3.2.4 Wells Complete in Granodiorite Bedrock

The monitoring wells MW-10, MW-11, and MW-12 are completed in granodiorite and exhibited similar water quality during 2018, characterized by:

- Calcium bicarbonate water type;
- Near neutral to slightly alkaline pH (7.17 to 8.04);
- Low sulfate concentrations (3 to 13 mg/L);
- Moderate TDS concentrations (171 to 227 mg/L); and
- Low concentrations of numerous dissolved metals, including: aluminum, barium, iron, lead, manganese, molybdenum, nickel, strontium, uranium, and zinc (Appendix D).

The trend graphs (Appendix D) exhibit overall stable concentrations at all wells without apparent seasonal trends. The pH measured at these sites throughout the baseline monitoring period indicates a range of values from near neutral (7.17 s.u.) to alkaline (8.03 s.u.). The trend graphs exhibit low nitrate+nitrite concentrations (< 1.0 mg/L). The concentrations of arsenic and thallium at all wells and iron at MW-12 have remained below the detection limit throughout the baseline monitoring period. However, the trend graphs for strontium at MW-10 and MW-11 exhibit slight to moderate variability, respectively, ranging from 0.26 mg/L to 1.37 mg/L at MW-11. With the exception of one anomaly at MW-11 in November 2017, the trend graphs for dissolved iron exhibit stable low concentrations at all wells. The elevated concentration of iron at MW-11 and variability of strontium at MW-10 and MW-11 are likely due to the relatively high turbidity observed during monitoring.

3.3.2.5 Core Hole Wells

The monitoring wells SC15-184, SC15-185, SC15-194, and SC15-198 exhibited similar water quality during 2018, characterized by the following:

- Calcium-magnesium bicarbonate type water;
- Near neutral to slightly alkaline pH (7.33 s.u. to 8.2 s.u.);
- Low sulfate concentrations (7 mg/L to 33 mg/L);

- Moderate TDS concentrations (194 mg/L to 234 mg/L); and
- Low concentrations of dissolved metals, including: barium, iron, manganese, molybdenum, selenium, strontium, uranium, and zinc (Appendix D).

The trend graphs exhibit overall stable concentrations at all wells without apparent seasonal trends. The pH measured at these sites throughout the baseline monitoring period indicates a range values from slightly acidic (6.1 s.u.) to alkaline (8.27 s.u.). The trend graphs exhibit low nitrate+nitrite concentrations (< 1.0 mg/L). With the exception of strontium, the trend graphs for dissolved metals exhibit stable trends with low concentrations near or below the detection limit.

3.3.2.6 Well Completed in YNL-B

The test well PW-10 is completed below the USZ in YNL-B. The groundwater at PW-10 during 2018 is characterized by the following:

- Calcium-magnesium bicarbonate-sulfate type water;
- Near neutral pH (7.35 s.u. to 7.41 s.u.);
- Moderate sulfate concentrations (199 mg/L to 203 mg/L);
- Elevated TDS concentrations (527 mg/L to 544 mg/L); and
- Low concentrations of dissolved metals, including: arsenic, barium, iron, manganese, strontium, and zinc (Appendix D).

The trend graphs exhibit overall stable concentrations at PW-10 without apparent seasonal trends. The pH measured at these sites throughout the baseline monitoring period indicates a range of values from neutral (7.02 s.u.) to slightly alkaline (7.54 s.u.). The trend graphs exhibit low nitrate+nitrite concentrations equivalent to the detection limit (0.01 mg/L) and concentrations of thallium below the detection limit. With the exception of strontium, the trend graphs for dissolved metals exhibit stable trends with low concentrations near or below the detection limit; the concentration of strontium ranges between 11.9 mg/L and 13.3 mg/L, exceeding the groundwater human health standard (4.0 mg/L) throughout the monitoring period.

3.3.2.7 Well Completed in the Lower Copper Zone (LCZ)

The test well PW-7 is completed in the LCZ and the water quality during 2018 is unique in comparison to other units, which is characterized by the following:

- Sodium bicarbonate type water;
- Alkaline pH (9.16 s.u.);
- low sulfate concentrations (11 mg/L);
- Elevated TDS concentrations (312 mg/L); and
- Low concentrations of dissolved metals, including: barium, iron, lead, manganese, molybdenum, strontium, and zinc (Appendix D).

Due to the limited amount of data for PW-7, water quality trends during the baseline period are not discernable. However, the trend graphs in Appendix D exhibit consistently low nutrient and dissolved metals concentrations.

3.4 QUALITY CONTROL

The field quality control sample plan consists of collecting one field duplicate and one field blank sample for each source water (groundwater, surface water, and springs) and one rinsate blank for the groundwater sampling equipment during each monitoring event. Field duplicate samples are replicate samples, collected from a single sampling location, to evaluate the combined reproducibility (precision) of the field sampling and laboratory analysis protocols. The field blank samples are collected to evaluate potential contamination from ambient conditions during sampling, sample containers and preservatives, and laboratory processing and analysis. For the purposes of this project, field duplicates were collected by rinsing and filling two samples containers consecutively from the sampling location and preserving. The field blank samples are collected by rinsing and pouring deionized (DI) water into sample containers and preserving. The rinsate (equipment) blanks, collected for groundwater quality sample analysis, consisted of sampling DI water after being processed through decontaminated sampling equipment (including filtration equipment as appropriate), collected into sample containers and preserved. The field quality control

samples are identified with a sequential sample code and are submitted blind to the laboratory.

The data quality for the monitoring conducted during 2018 was evaluated using standard laboratory QC samples and field duplicates, blanks, and rinsate blanks. Field duplicates were collected at surface water sites SW-1, SW-2, SW-3, SW-6, SW-14, SW-17, and USGS-SC1; springs DS-3, SP-4, SP-6, SP-7, and SP-10; and wells MW-2B, MW-8, MW-16, MW-18, and MW-19. Qualifiers applied to data as a result of the validation process are described in the quarterly QA/QC reviews included in Appendix E. The QA/QC data did not indicate any systematic data quality issues for 2018. A summary of field QC sample quality control limit exceedances are provided below.

First Quarter Monitoring:

- Two field blanks, collected in January, reported concentrations for dissolved strontium equivalent to the project required detection limit (Appendix E);
- A field duplicate sample, collected at SP-7 in February, exceeded the control limits for TDS (Appendix E);
- Two parameters (dissolved aluminum and zinc) in a field duplicate sample, collected at MW-18 in March, exceeded the control limits (Appendix E); and
- Field blank control limits were not exceeded in February and March.

Second Quarter Monitoring:

- Field blank control limits were not exceeded in April and May;
- Two field duplicate samples, collected in April, exceeded the control limit for total phosphorus (SW-1) and total suspended solids (SP-4) (Appendix E);
- The field duplicate sample, collected at SP-7 in May, exceeded the control limits for iron (Appendix E);
- One field blank, collected in June, reported hardness equivalent to the project required detection limit (PRDL) and dissolved strontium concentration slightly

greater than the PRDL. One rinsate blank, collected in June, reported hardness and dissolved strontium equivalent to the PRDL (Appendix E); and

- Field duplicate control limits were not exceeded in June.

Third Quarter Monitoring:

- Field duplicate and blank control limits were not exceeded in July;
- The field duplicate sample, collected at SW-17 in August, exceeded the control limits for total suspended solids, total phosphorus, total persulfate nitrogen, and total recoverable iron and zinc (Appendix E);
- The field duplicate sample, collected at SW-17 in September, exceeded the control limits for total phosphorus (Appendix E); and
- Field blank control limits were not exceeded in August and September.

Fourth Quarter Monitoring:

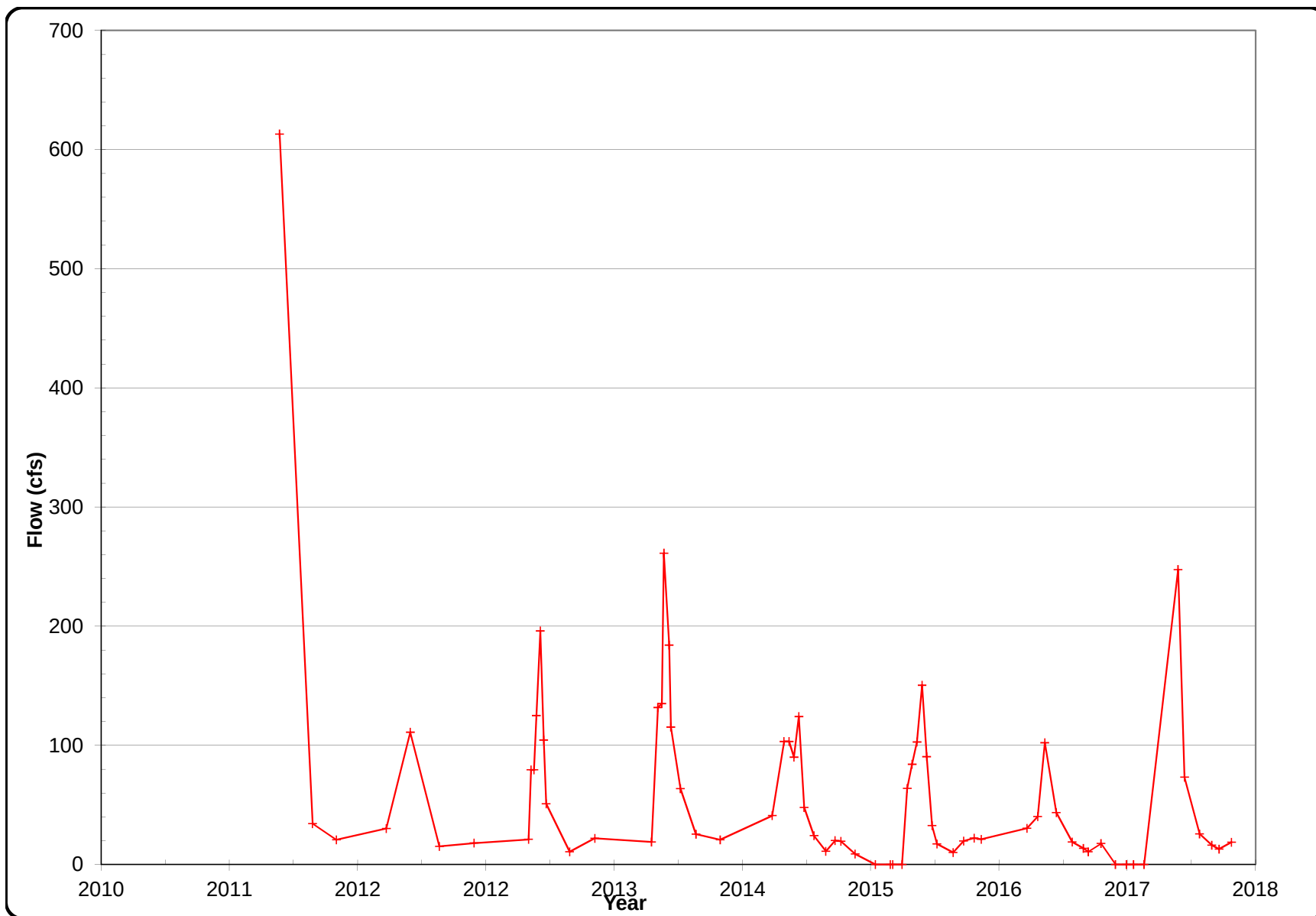
- Field duplicate and blank control limits were not exceeded in October;
- The field duplicate sample, collected at MW-16 in November, exceeded the control limits for total suspended solids. (Appendix E);
- The field duplicate sample, collected at SP-4 in December, exceeded the control limits for total suspended solids (Appendix E); and
- Field blank control limits were not exceeded in November and December.

4.0 REFERENCES

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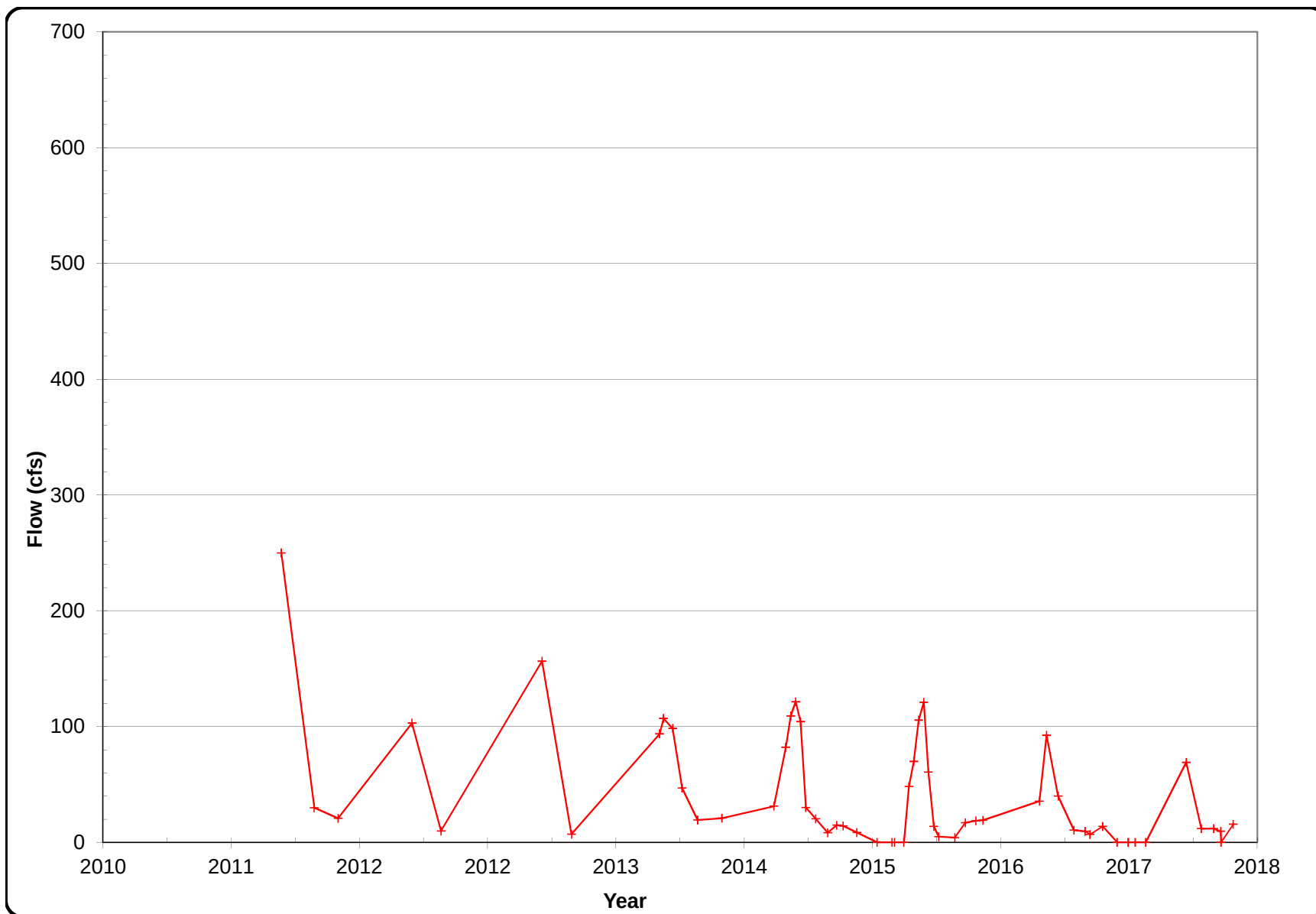
APPENDIX A1

**SURFACE WATER AND
SPRING FLOW DATA SUMMARY**



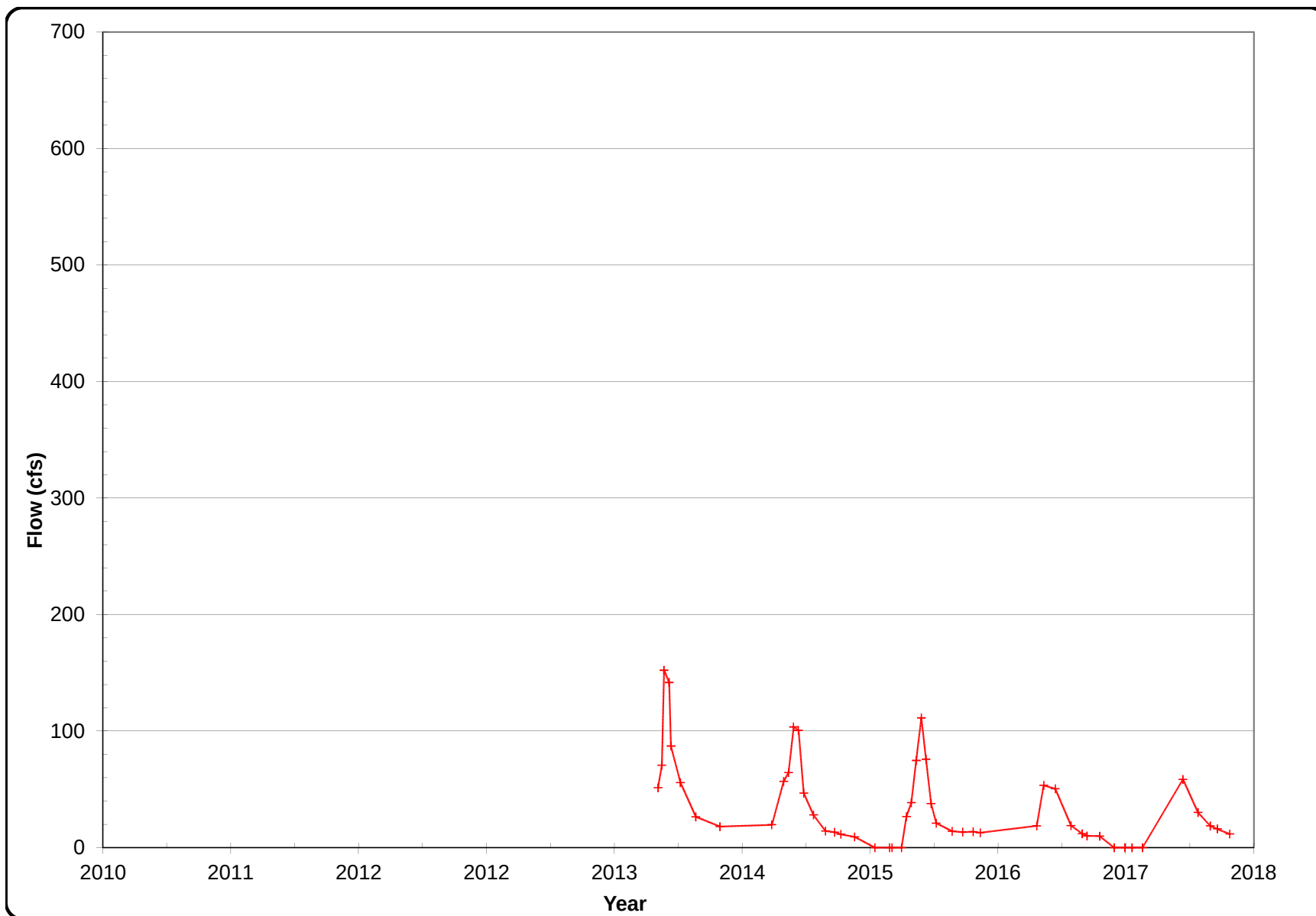
Hydrometrics, Inc.
Consulting Scientists and Engineers

**SW-1 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



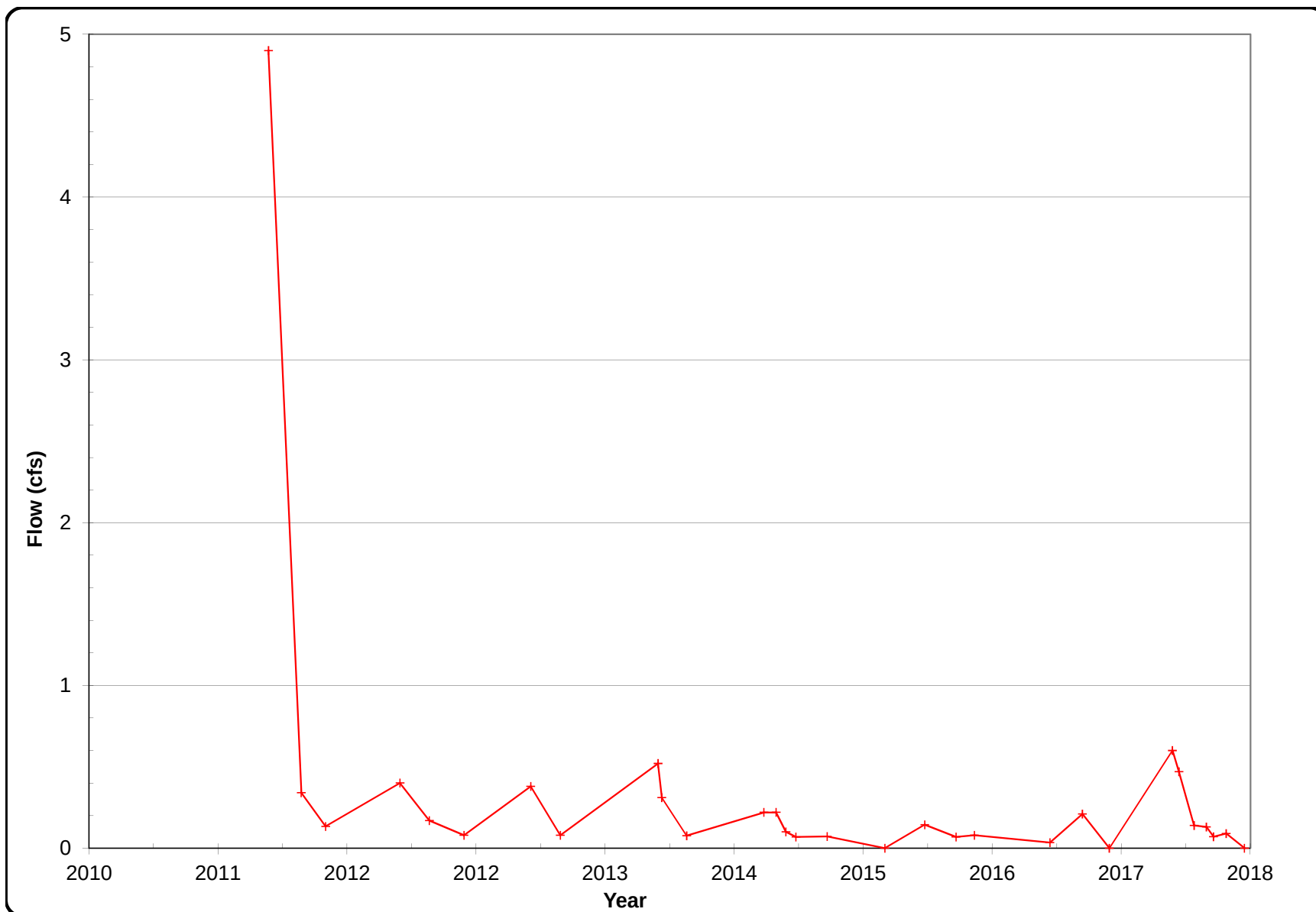
Hydrometrics, Inc.
Consulting Scientists and Engineers

**SW-2 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



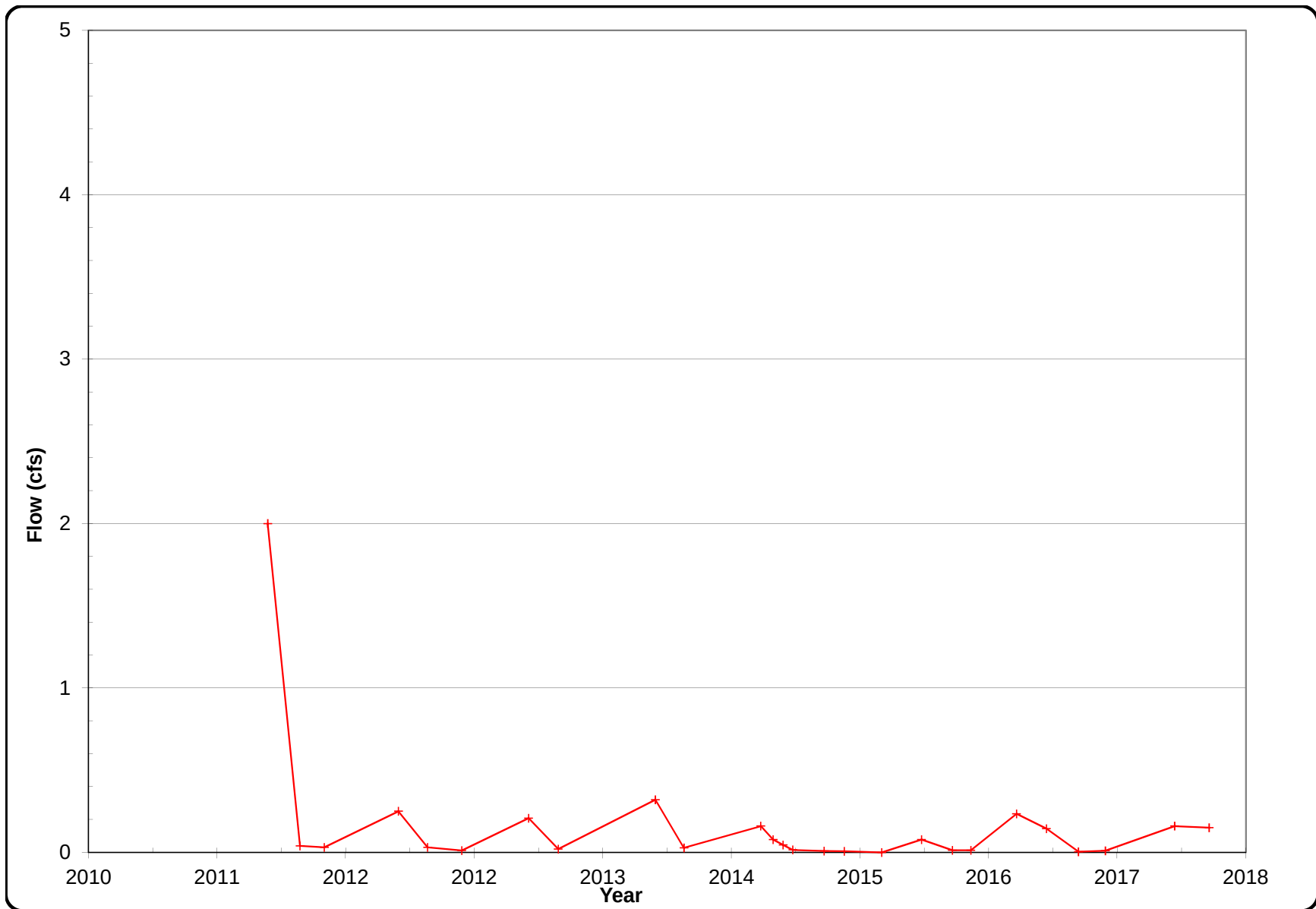
Hydrometrics, Inc.
Consulting Scientists and Engineers

**USGS-SC1 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



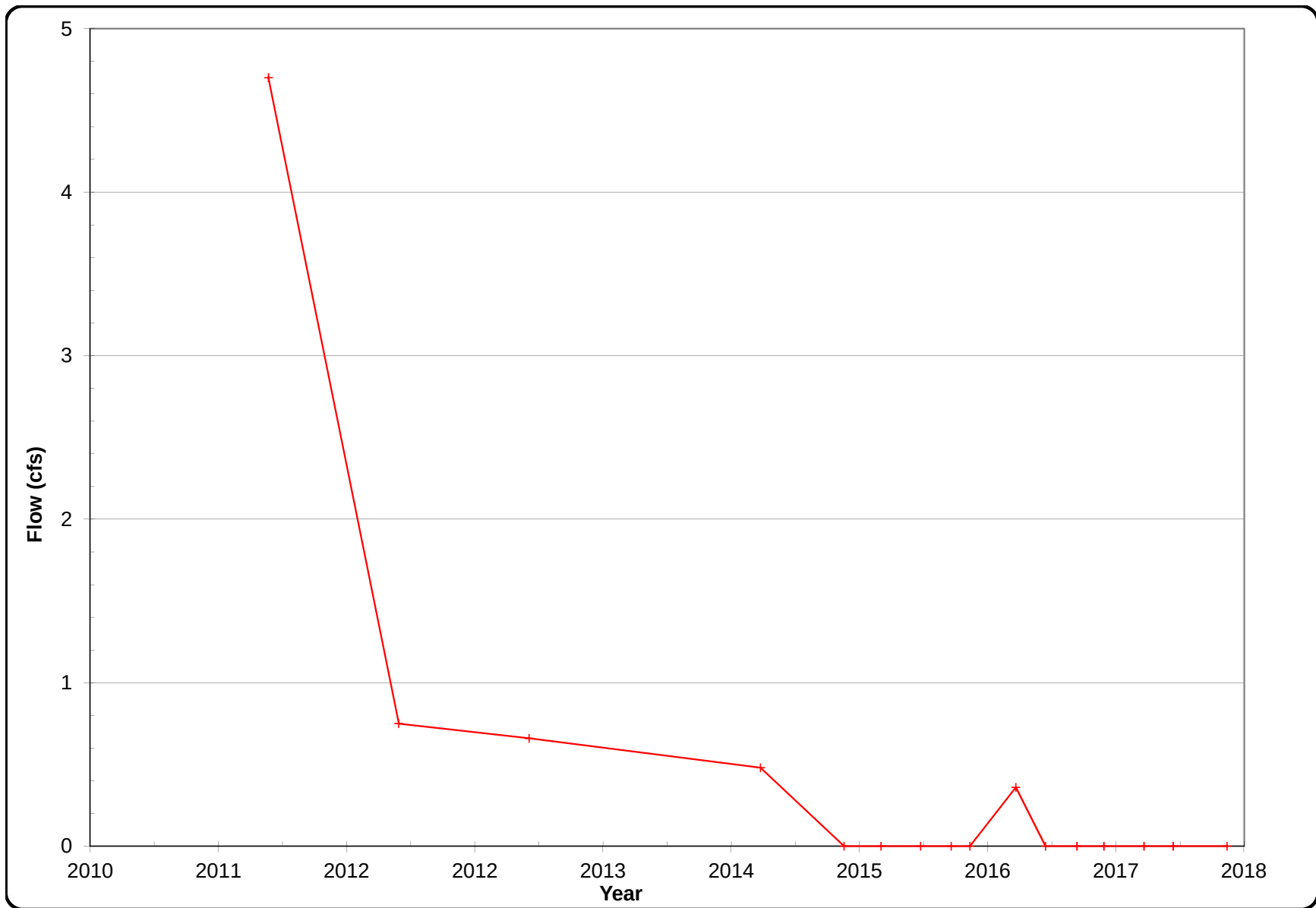
Hydrometrics, Inc.
Consulting Scientists and Engineers

**SW-3 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



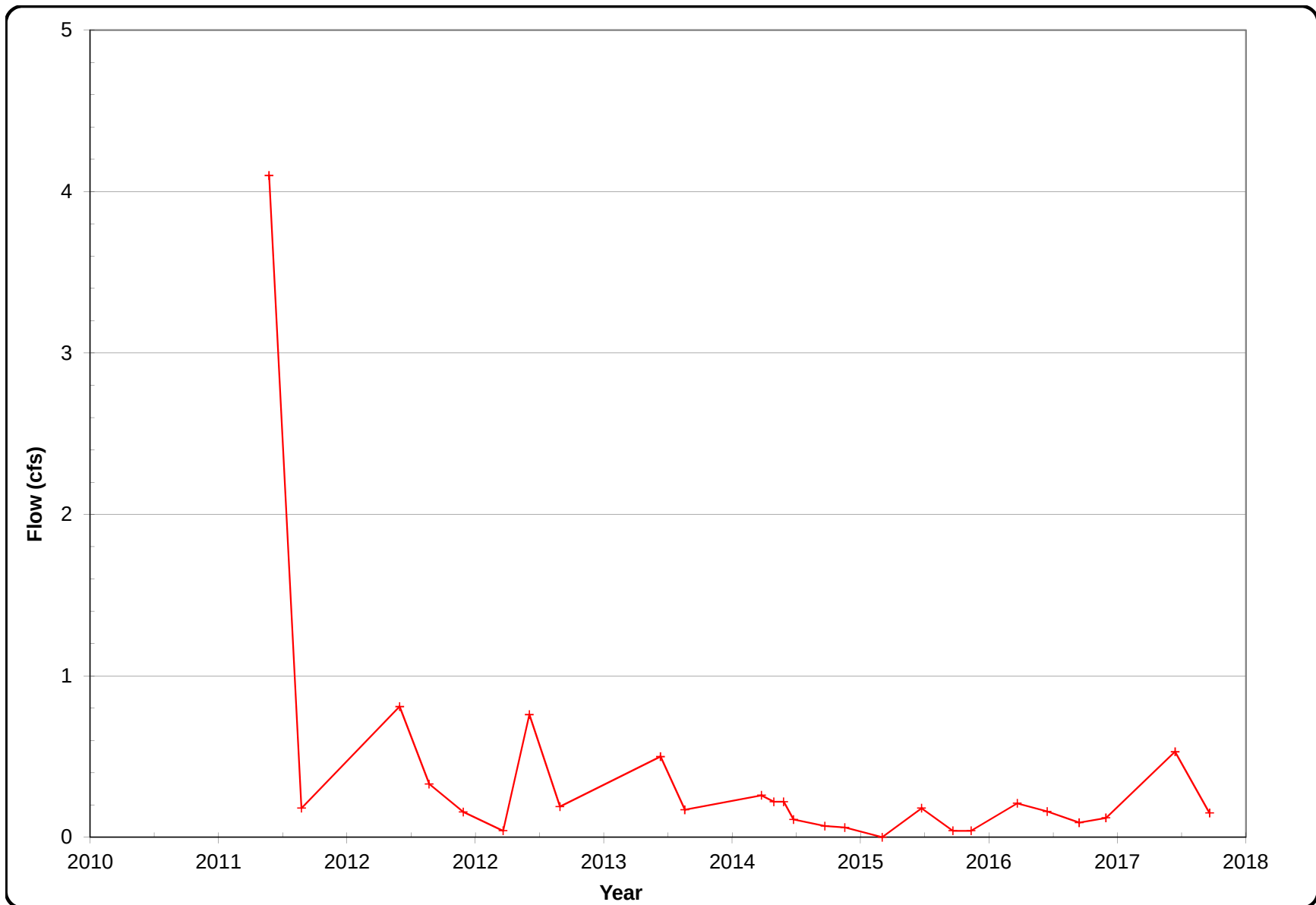
Hydrometrics, Inc.
Consulting Scientists and Engineers

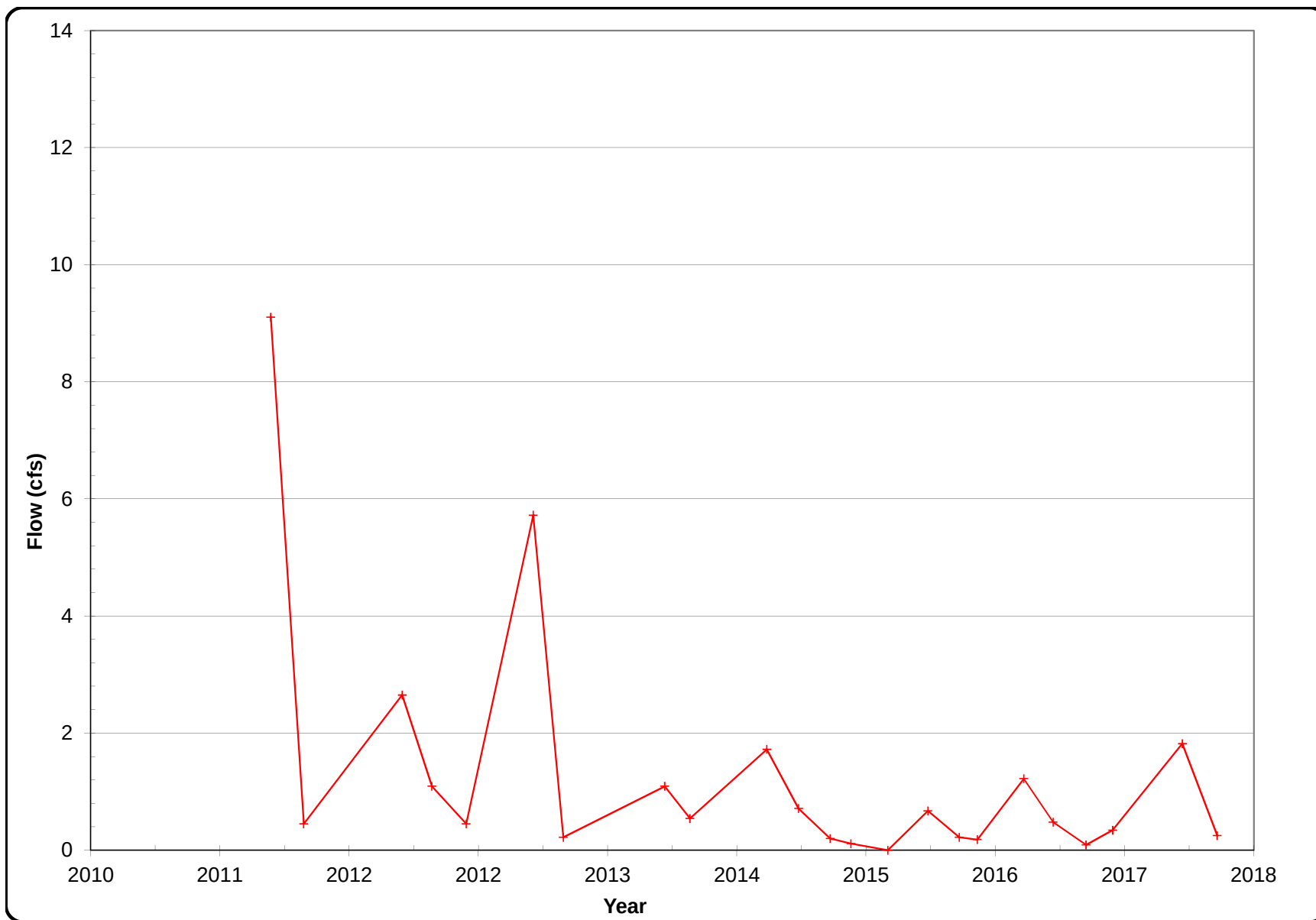
**SW-4 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



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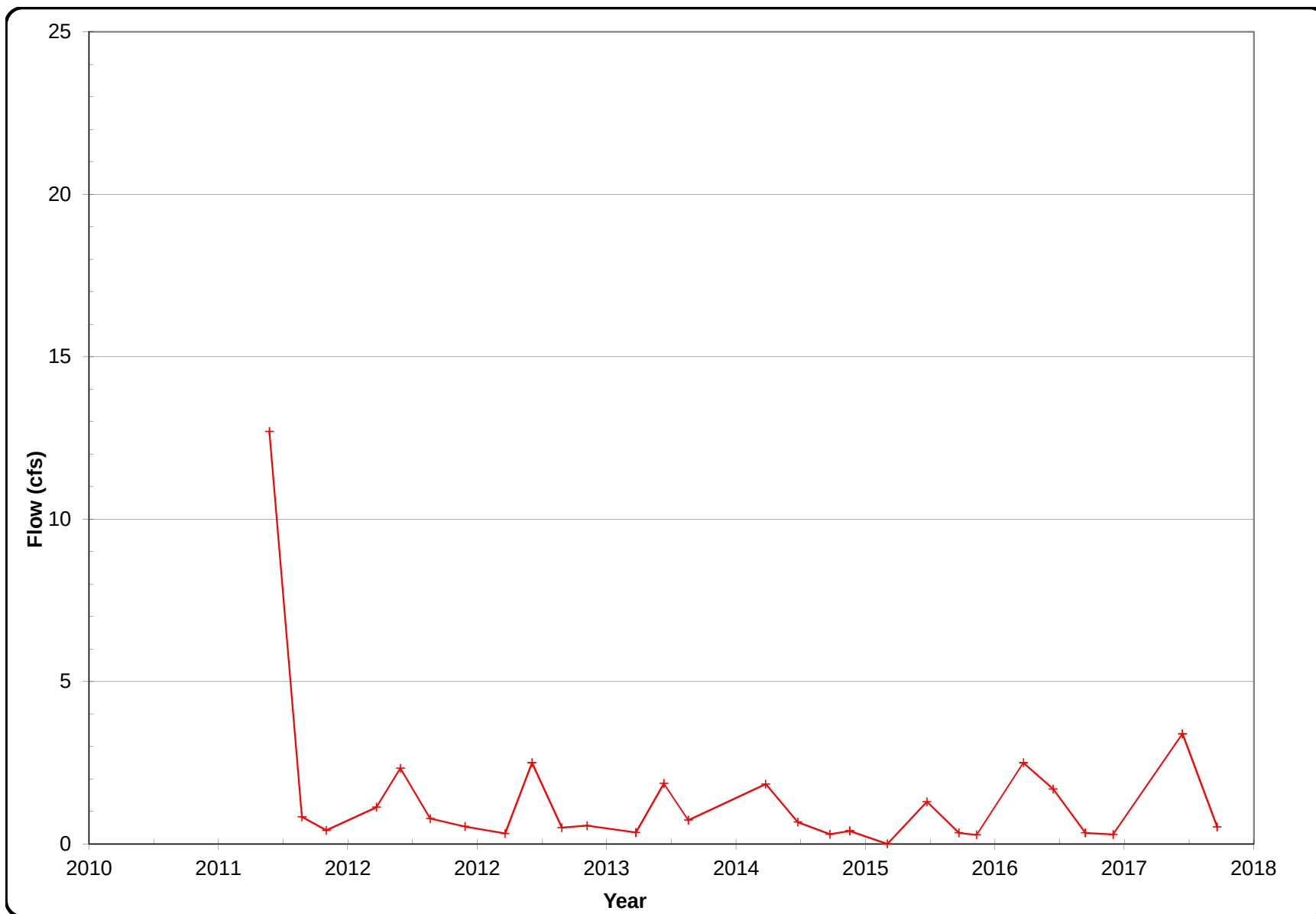
**SW-5 Hydrograph
Black Butte Copper Project
Meagher County, Montana**





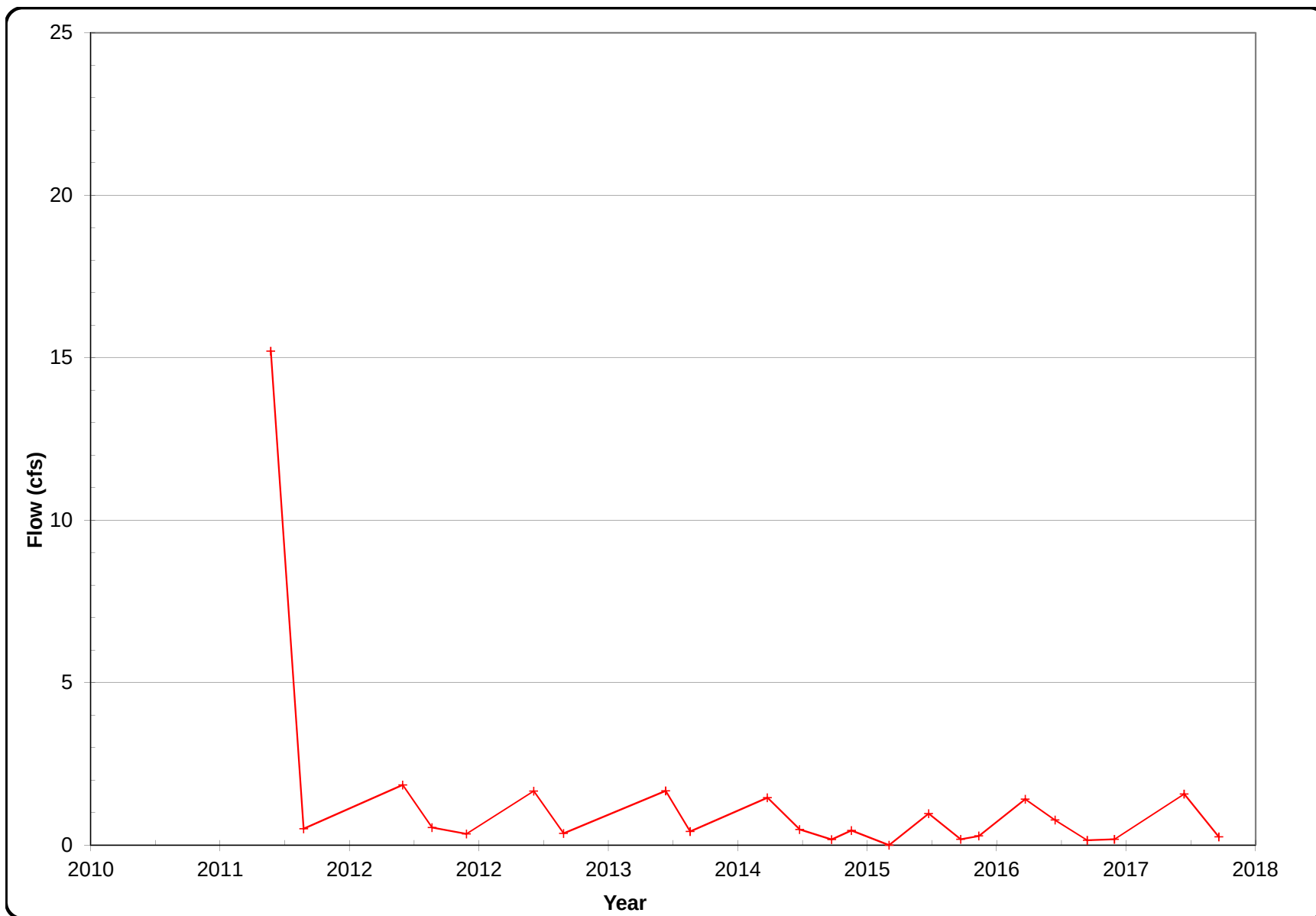
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Consulting Scientists and Engineers

**SW-8 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



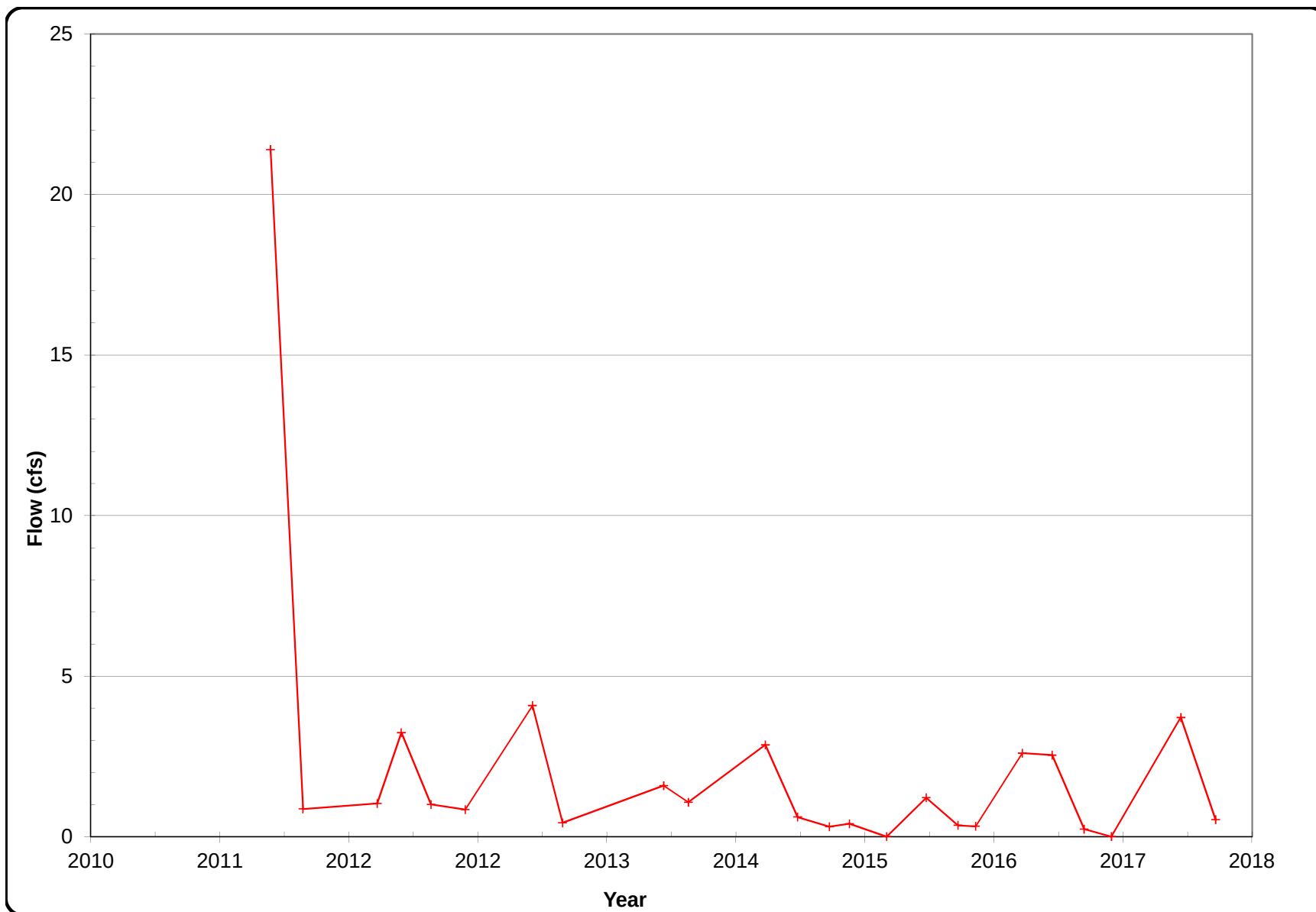
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Consulting Scientists and Engineers

**SW-9 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



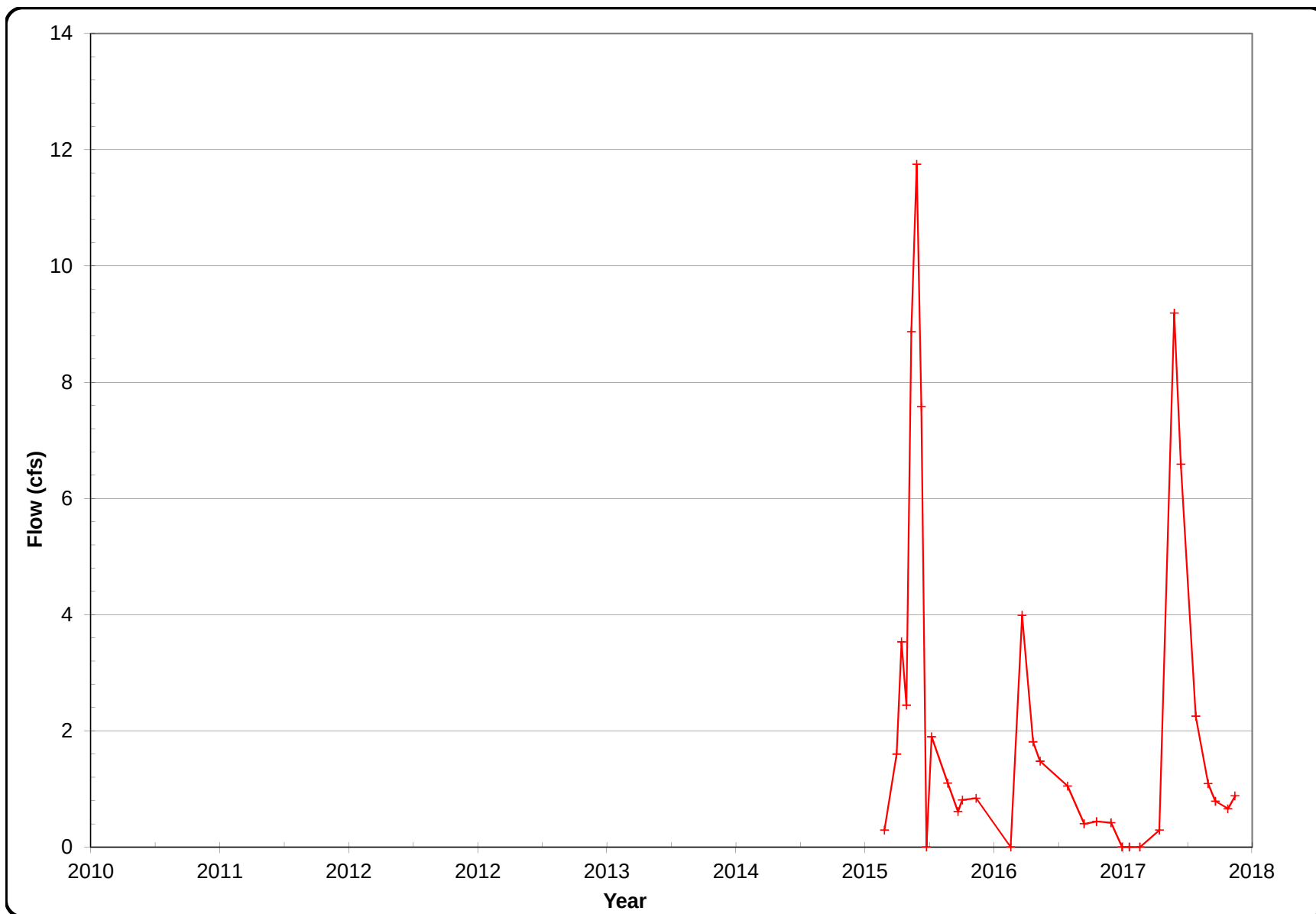
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Consulting Scientists and Engineers

**SW-10 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



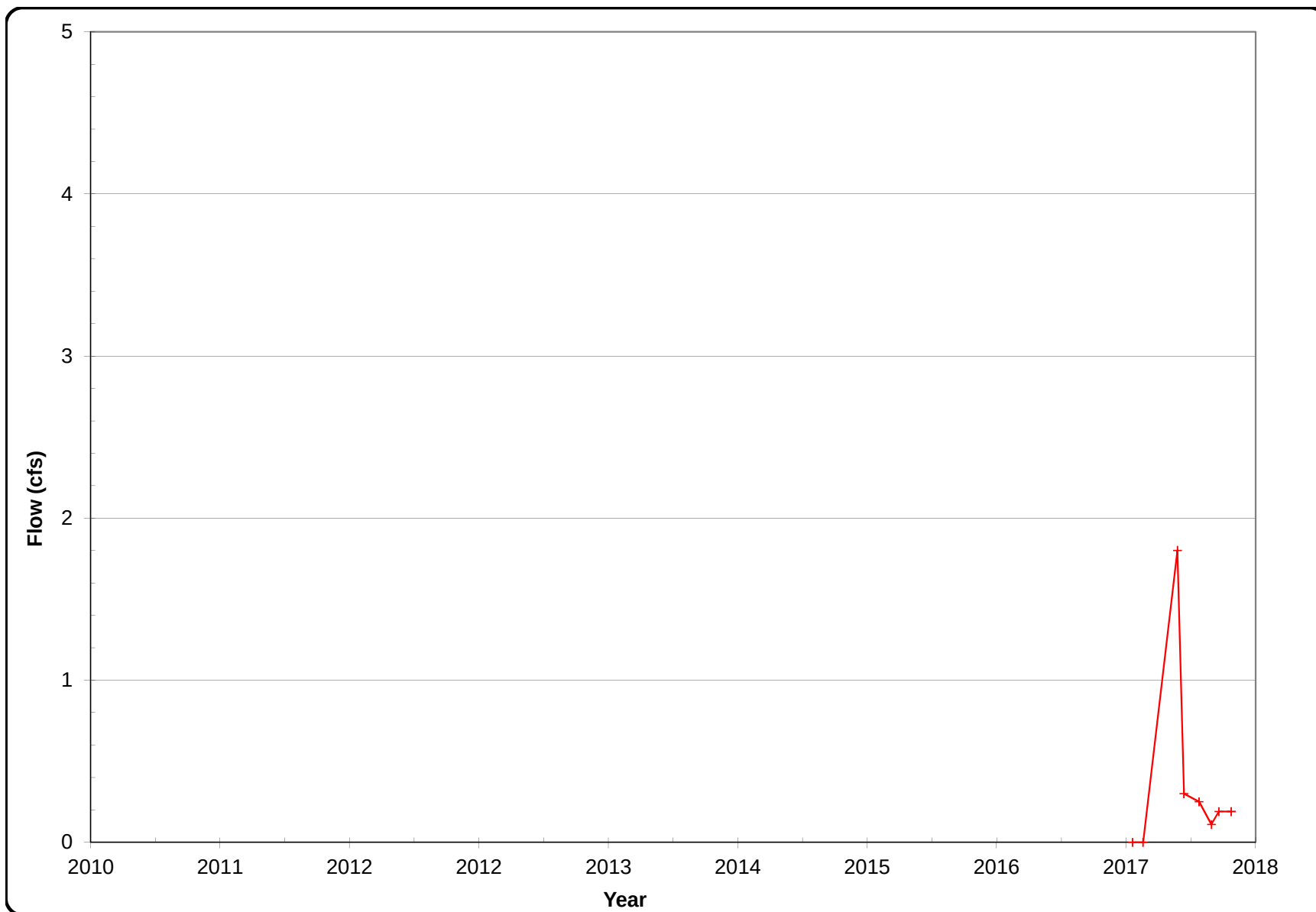
Hydrometrics, Inc.
Consulting Scientists and Engineers

**SW-11 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



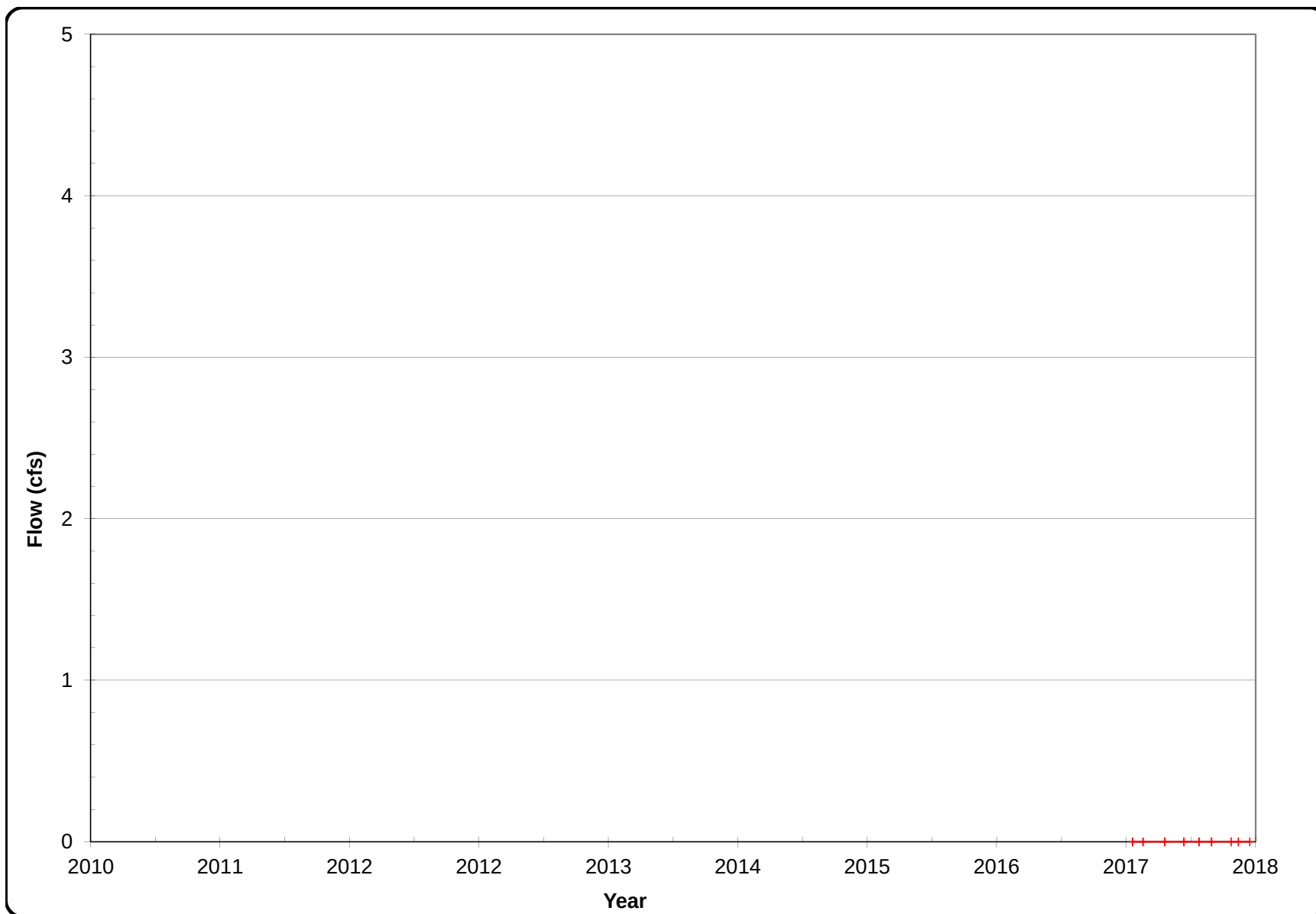
Hydrometrics, Inc.
Consulting Scientists and Engineers

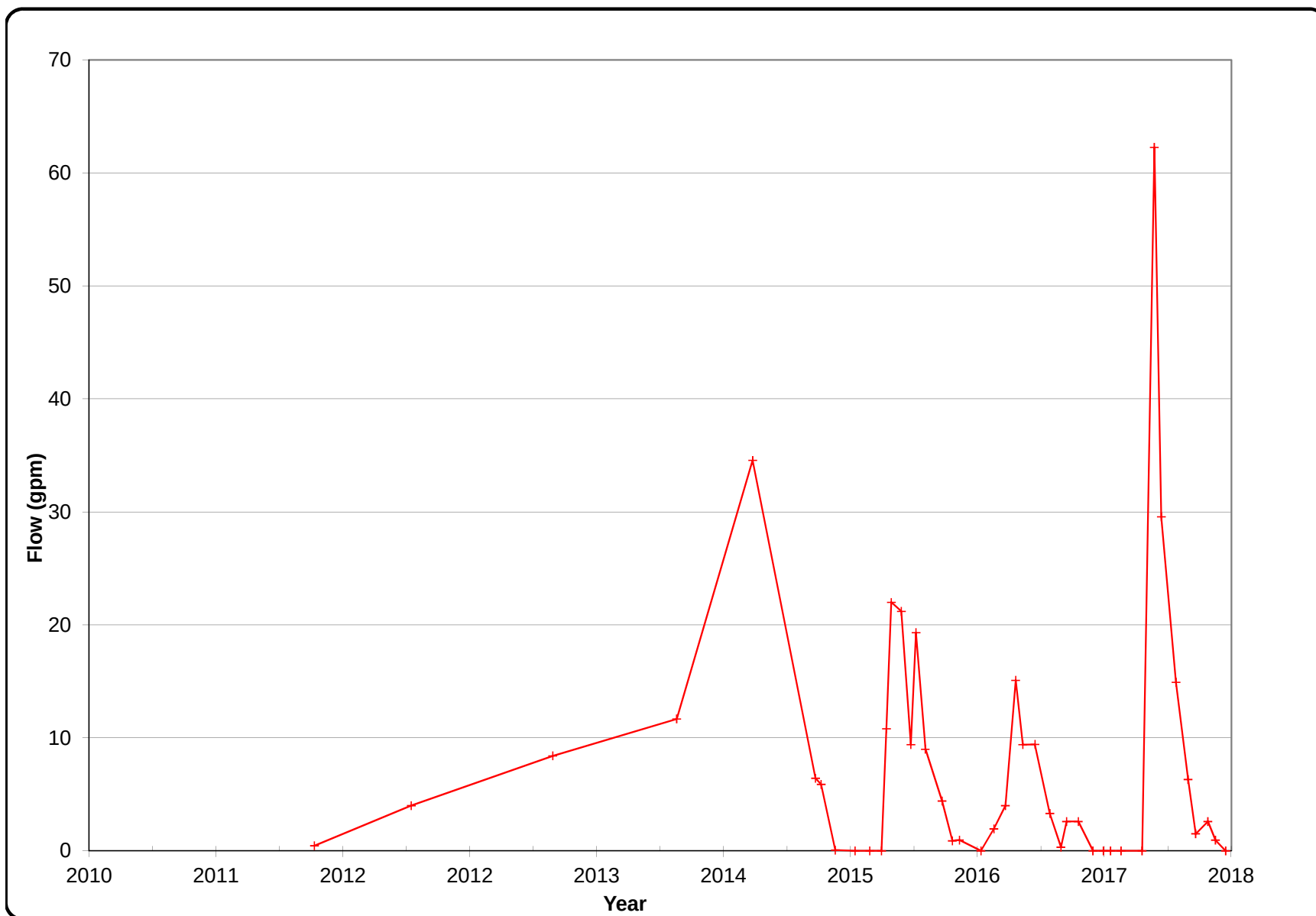
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Black Butte Copper Project
Meagher County, Montana**



Hydrometrics, Inc.
Consulting Scientists and Engineers

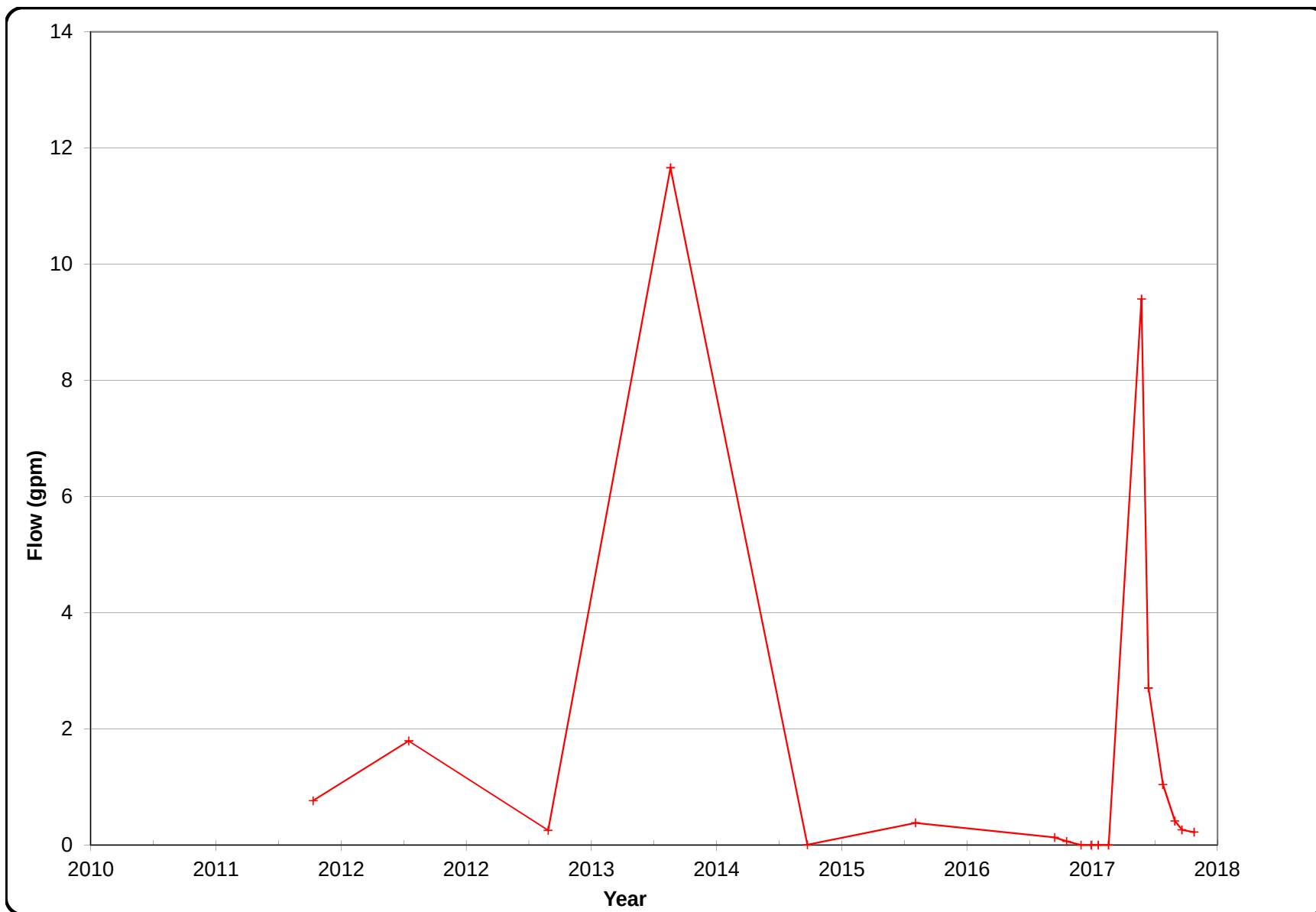
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Black Butte Copper Project
Meagher County, Montana**





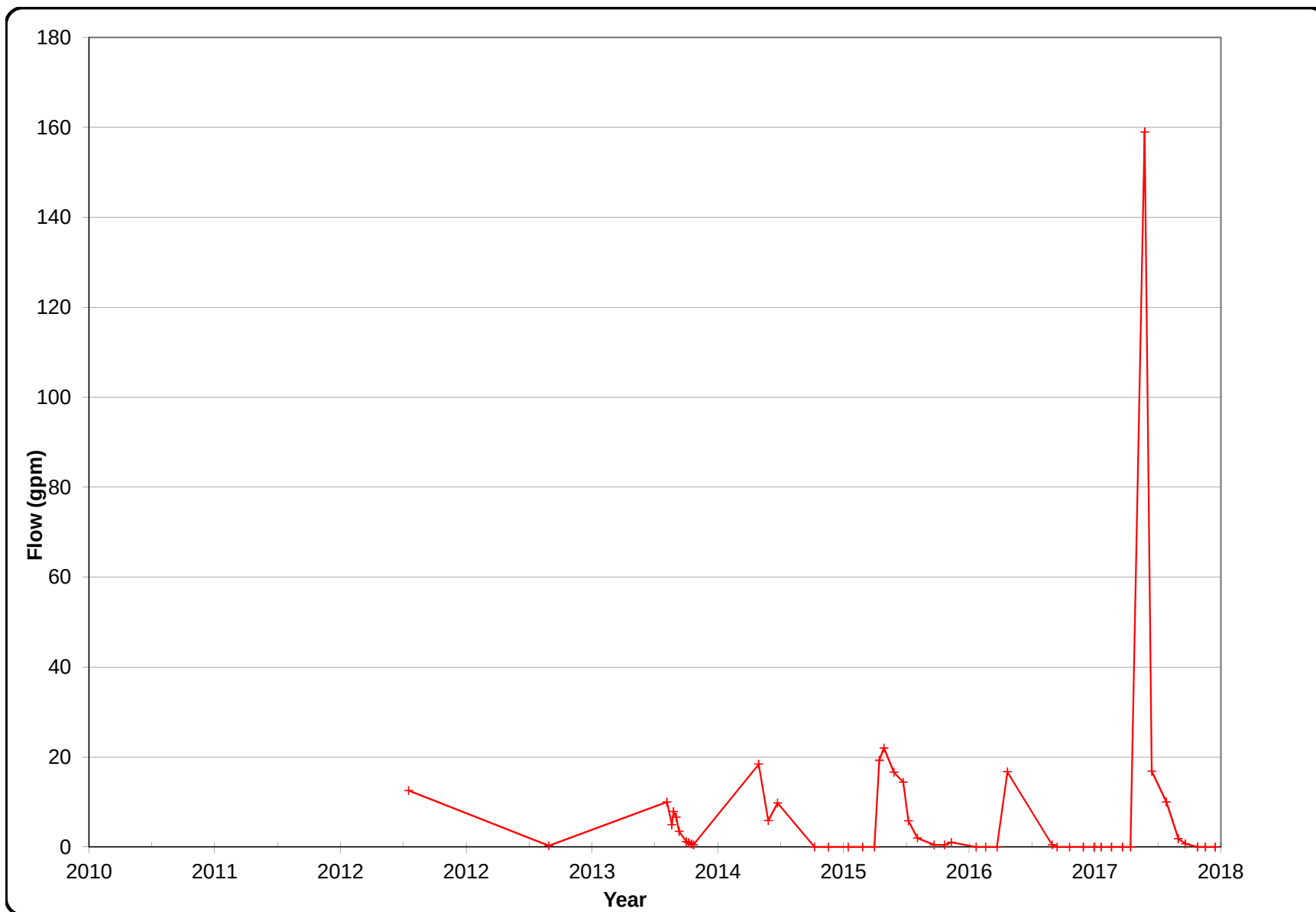
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Consulting Scientists and Engineers

**DS-1 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



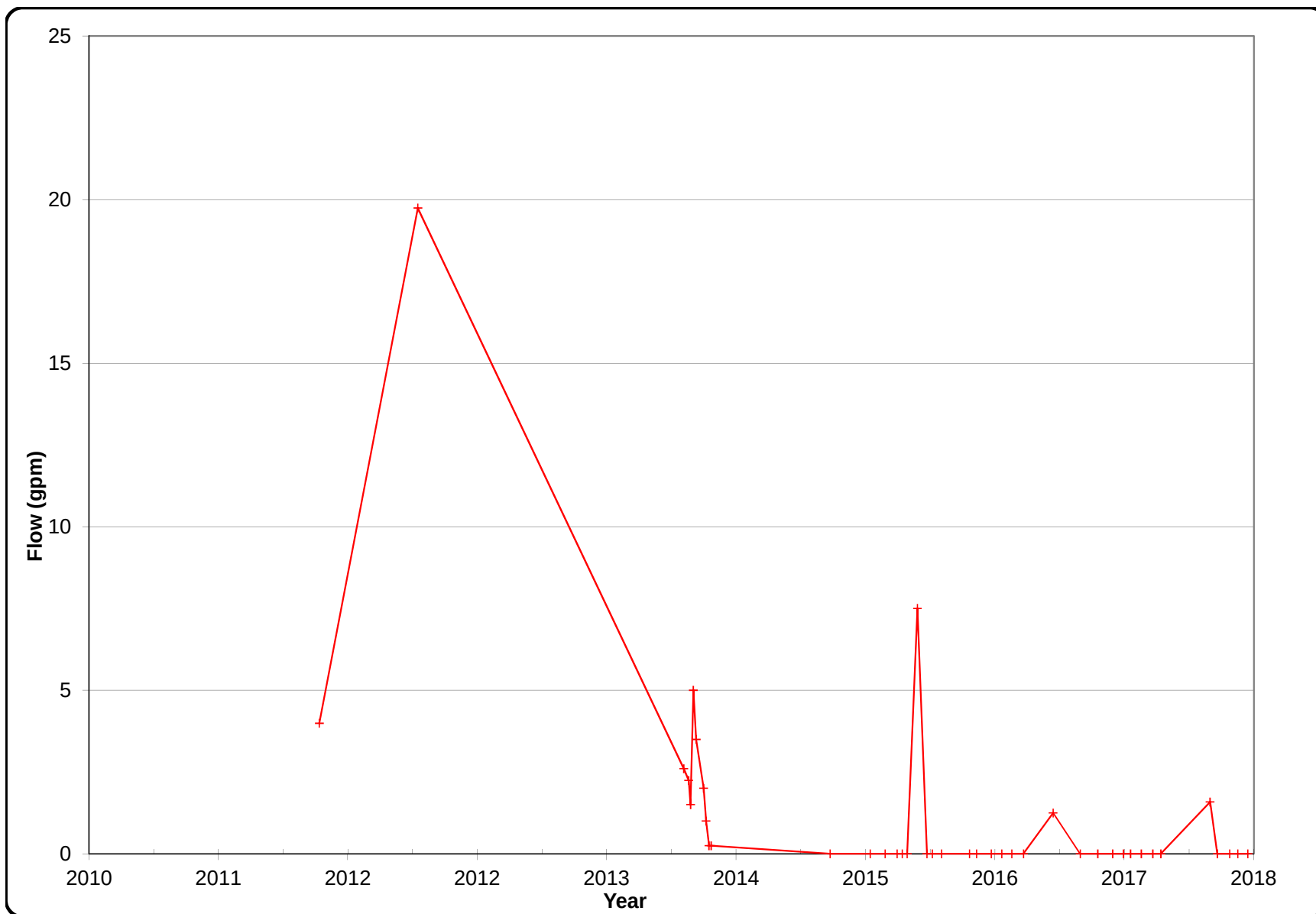
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Consulting Scientists and Engineers

**DS-2 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



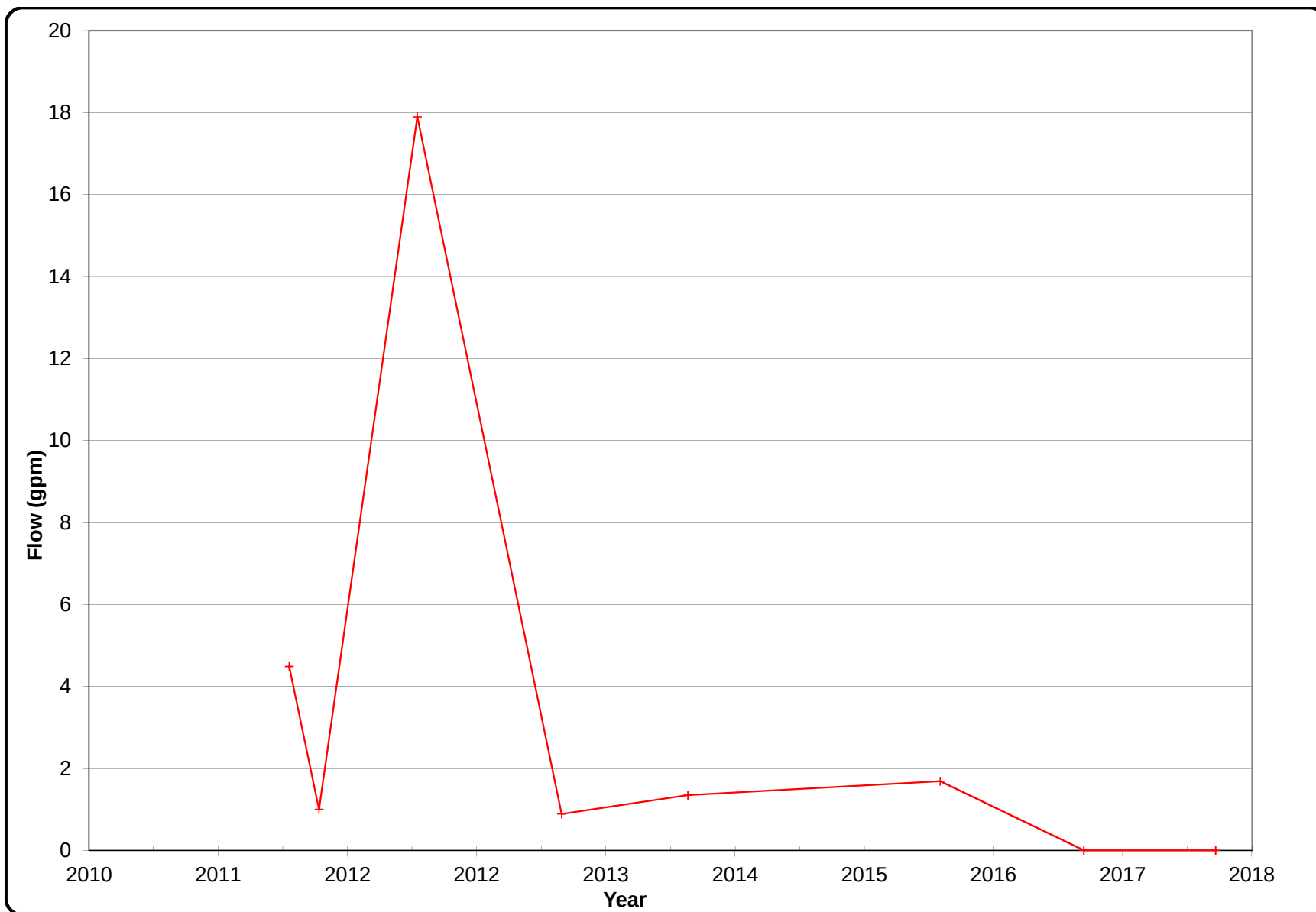
Hydrometrics, Inc.
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DS-3 Hydrograph
Black Butte Copper Project
Meagher County, Montana



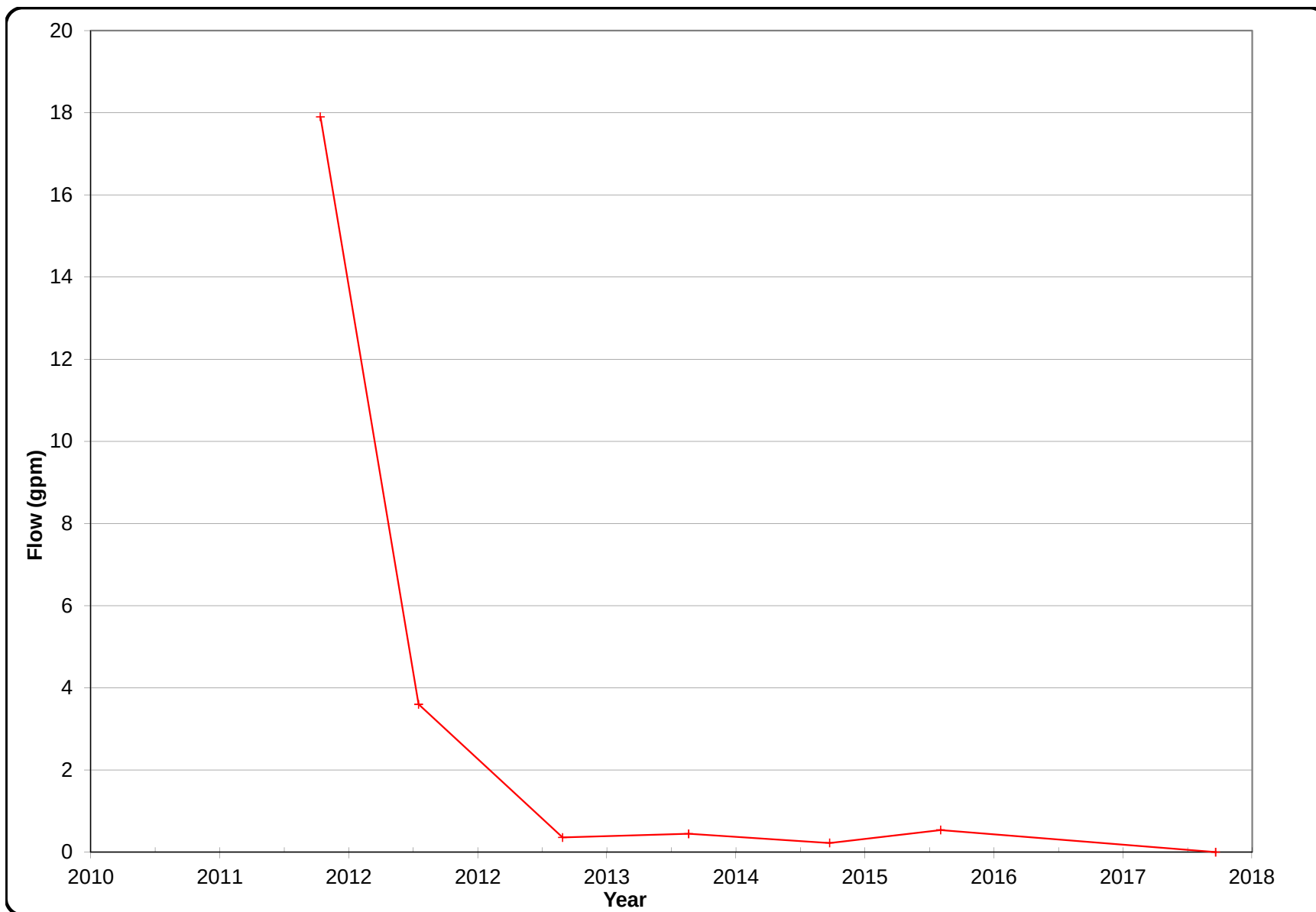
Hydrometrics, Inc.
Consulting Scientists and Engineers

**DS-4 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



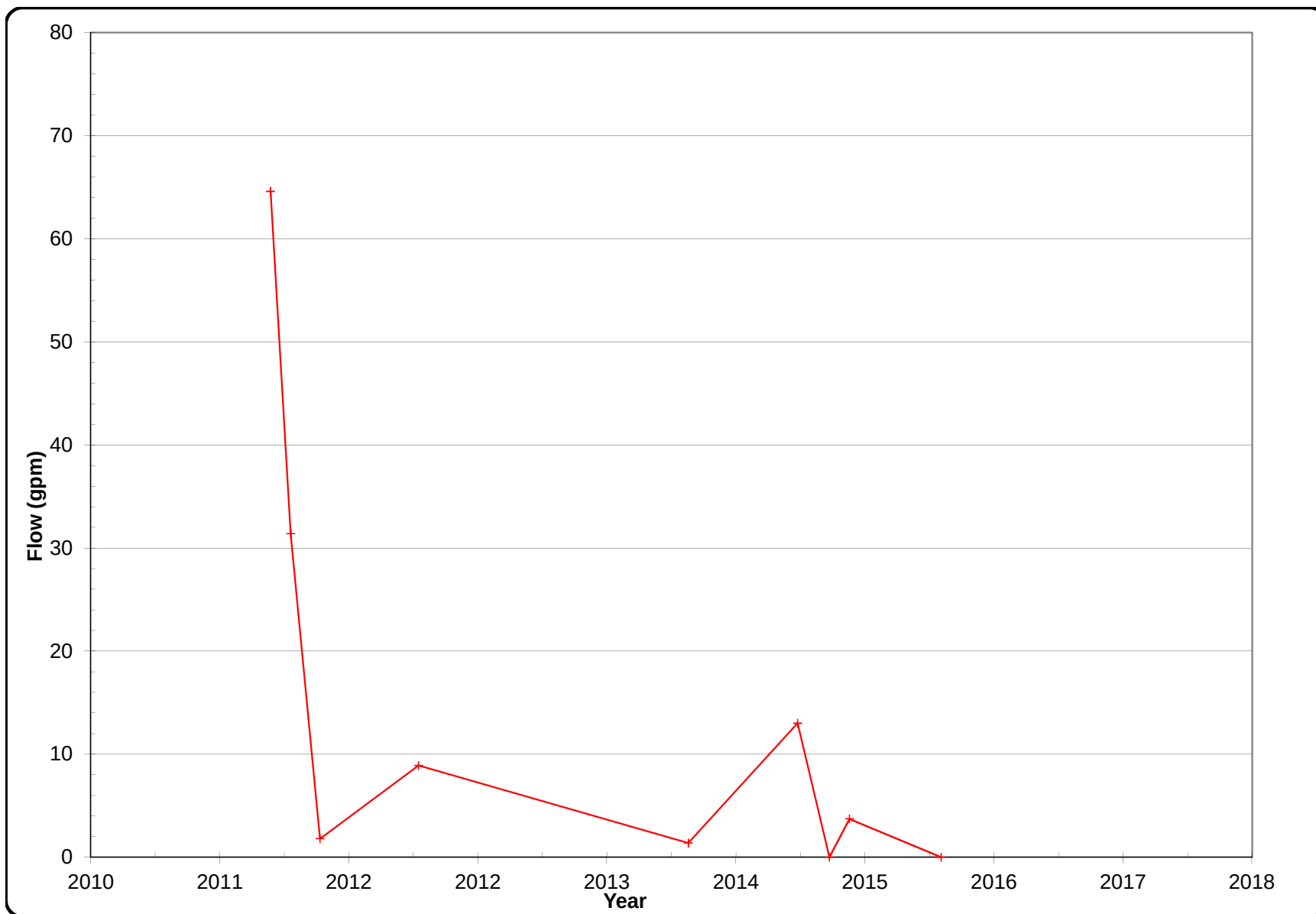
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Consulting Scientists and Engineers

**DS-5 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



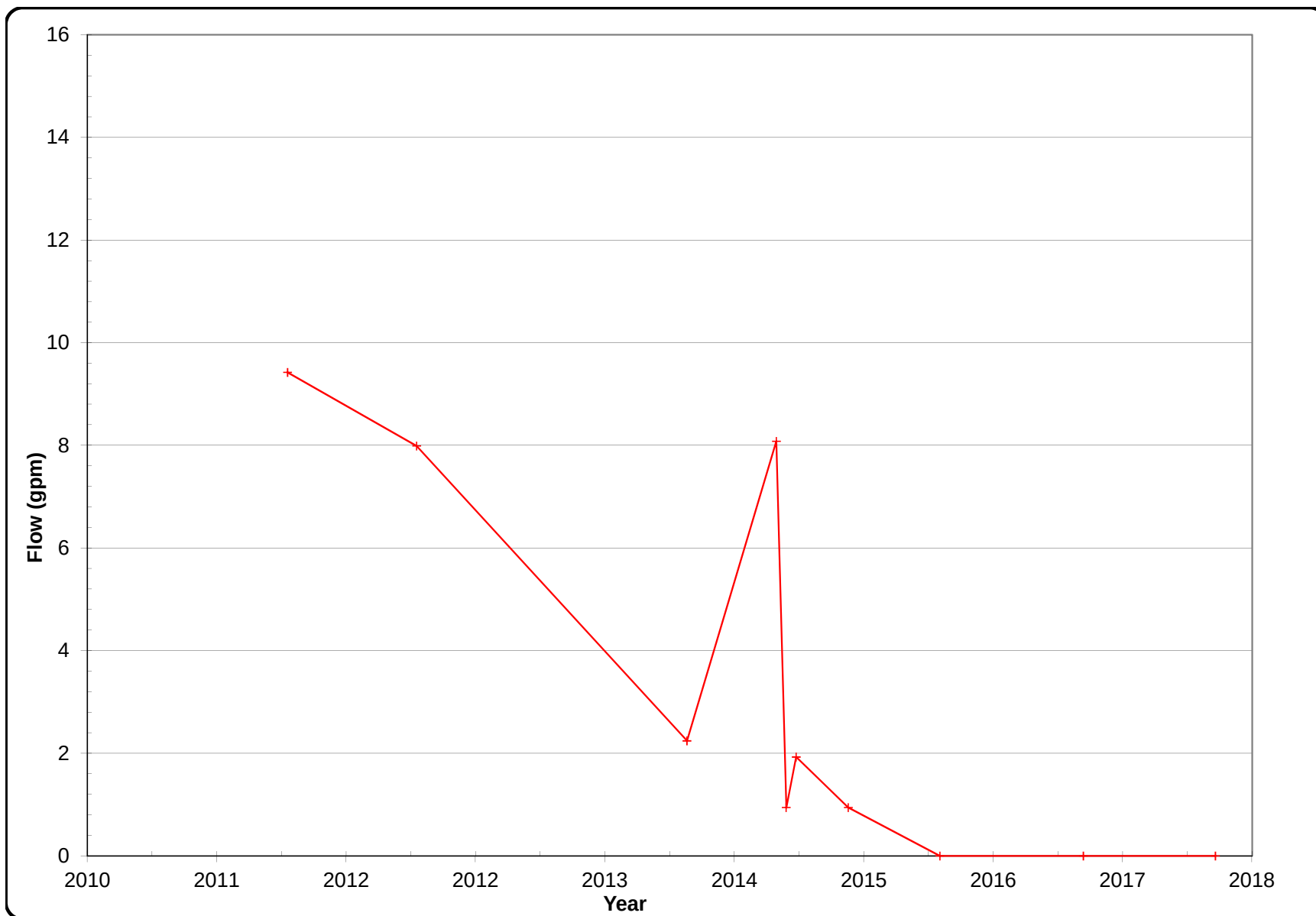
Hydrometrics, Inc.
Consulting Scientists and Engineers

**DS-6 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



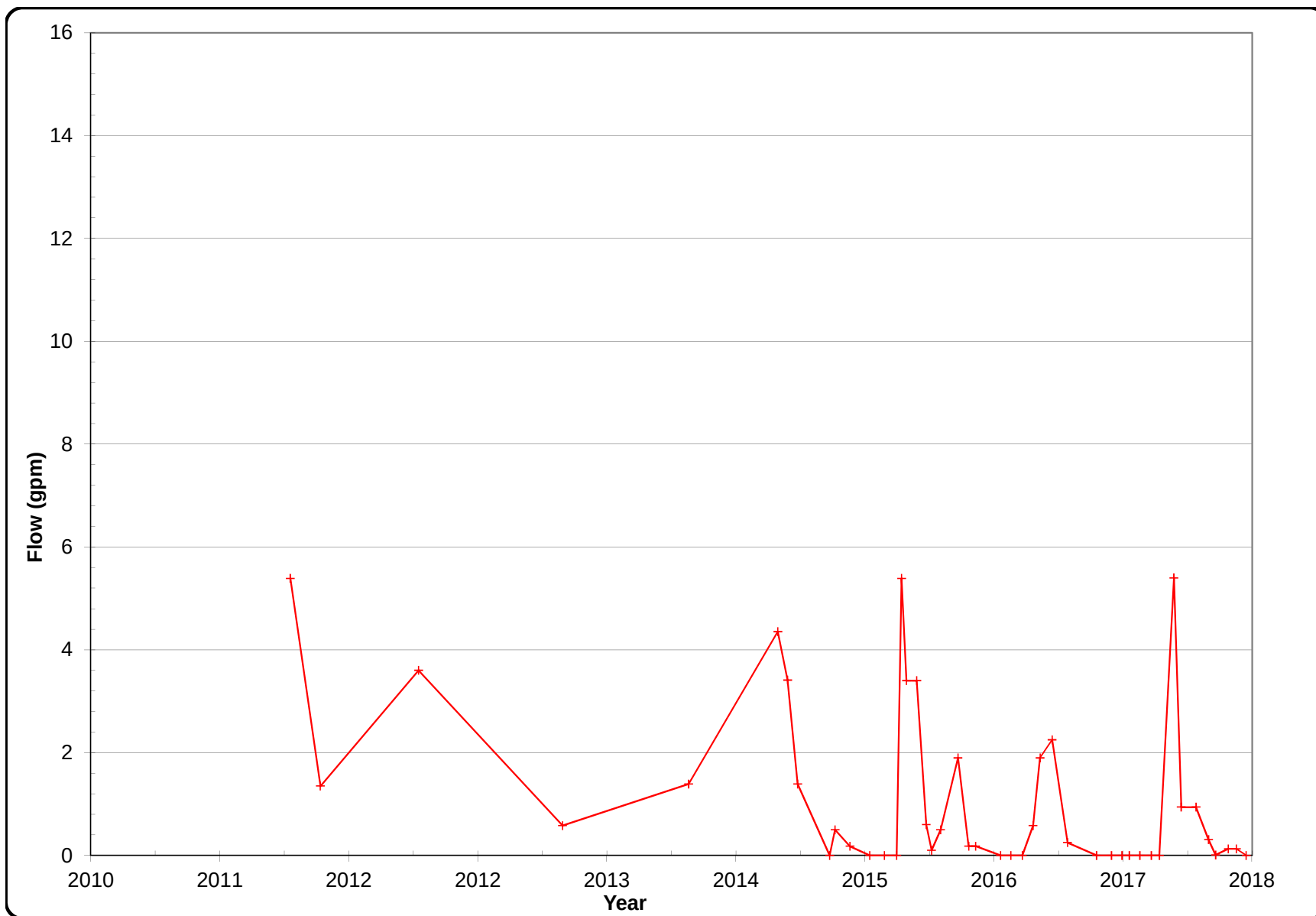
Hydrometrics, Inc.
Consulting Scientists and Engineers

**SP-1 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



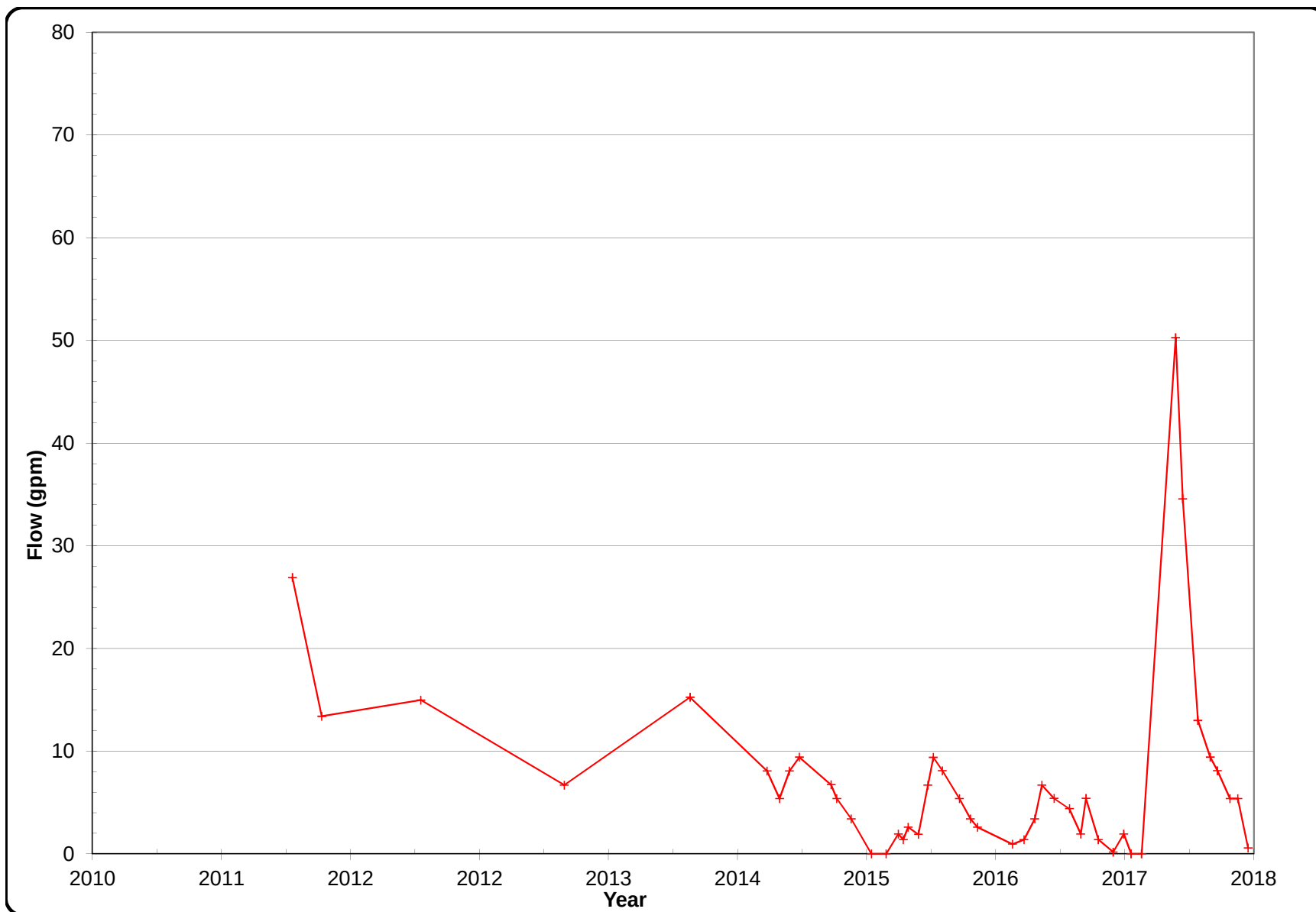
Hydrometrics, Inc.
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**SP-2 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



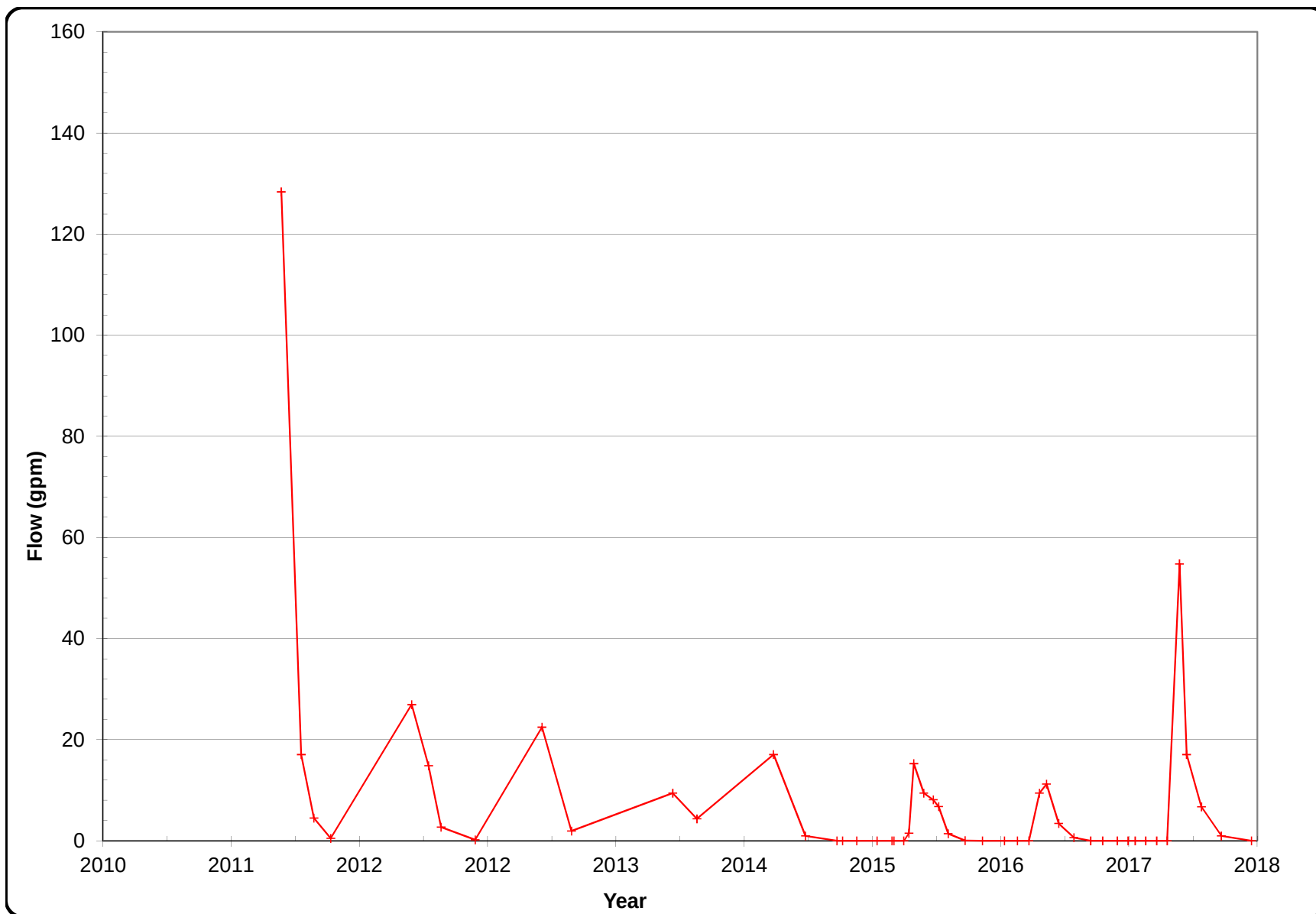
Hydrometrics, Inc.
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**SP-3 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



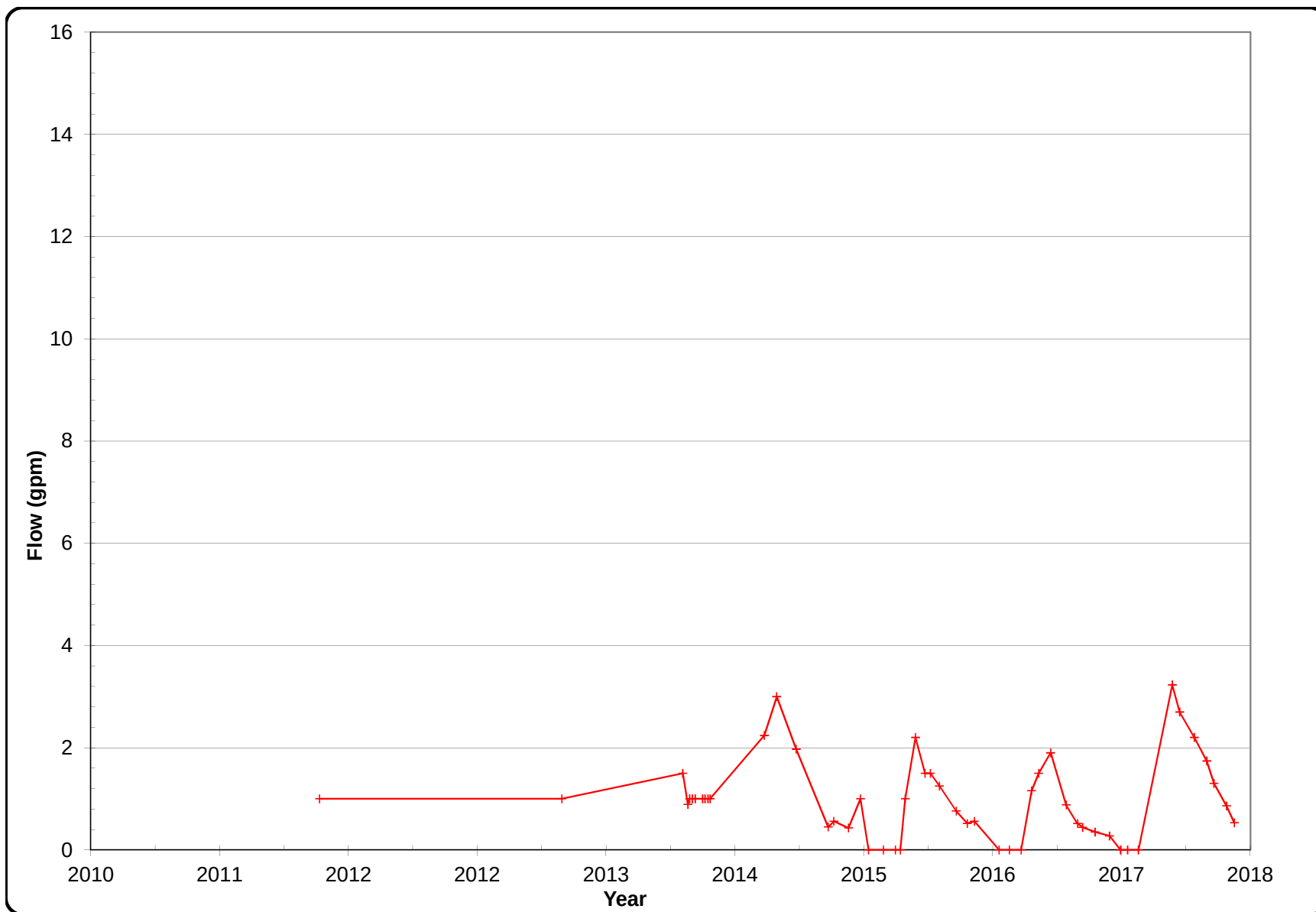
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Consulting Scientists and Engineers

**SP-4 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



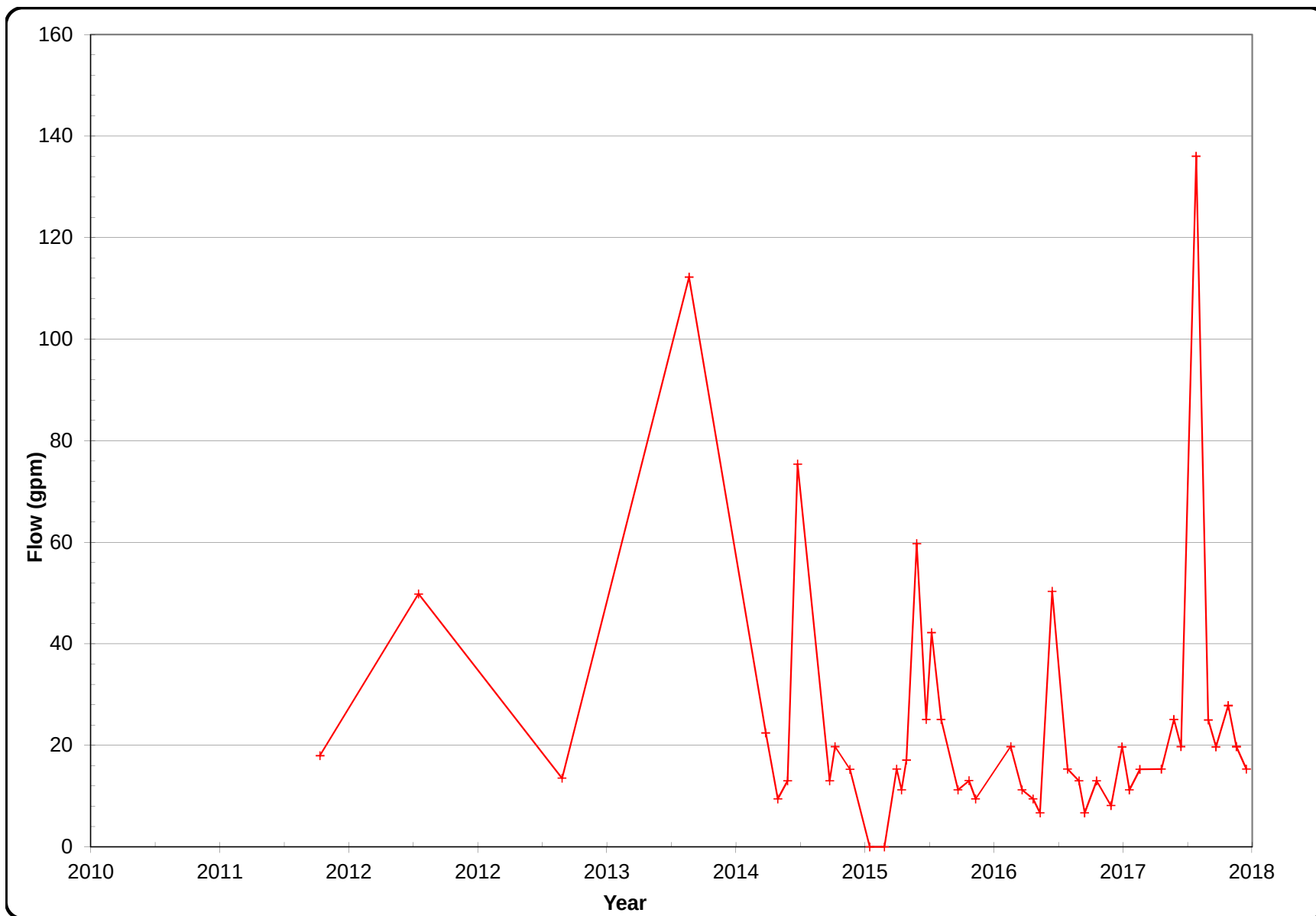
Hydrometrics, Inc.
Consulting Scientists and Engineers

**SP-5 (SW-7) Hydrograph
Black Butte Copper Project
Meagher County, Montana**



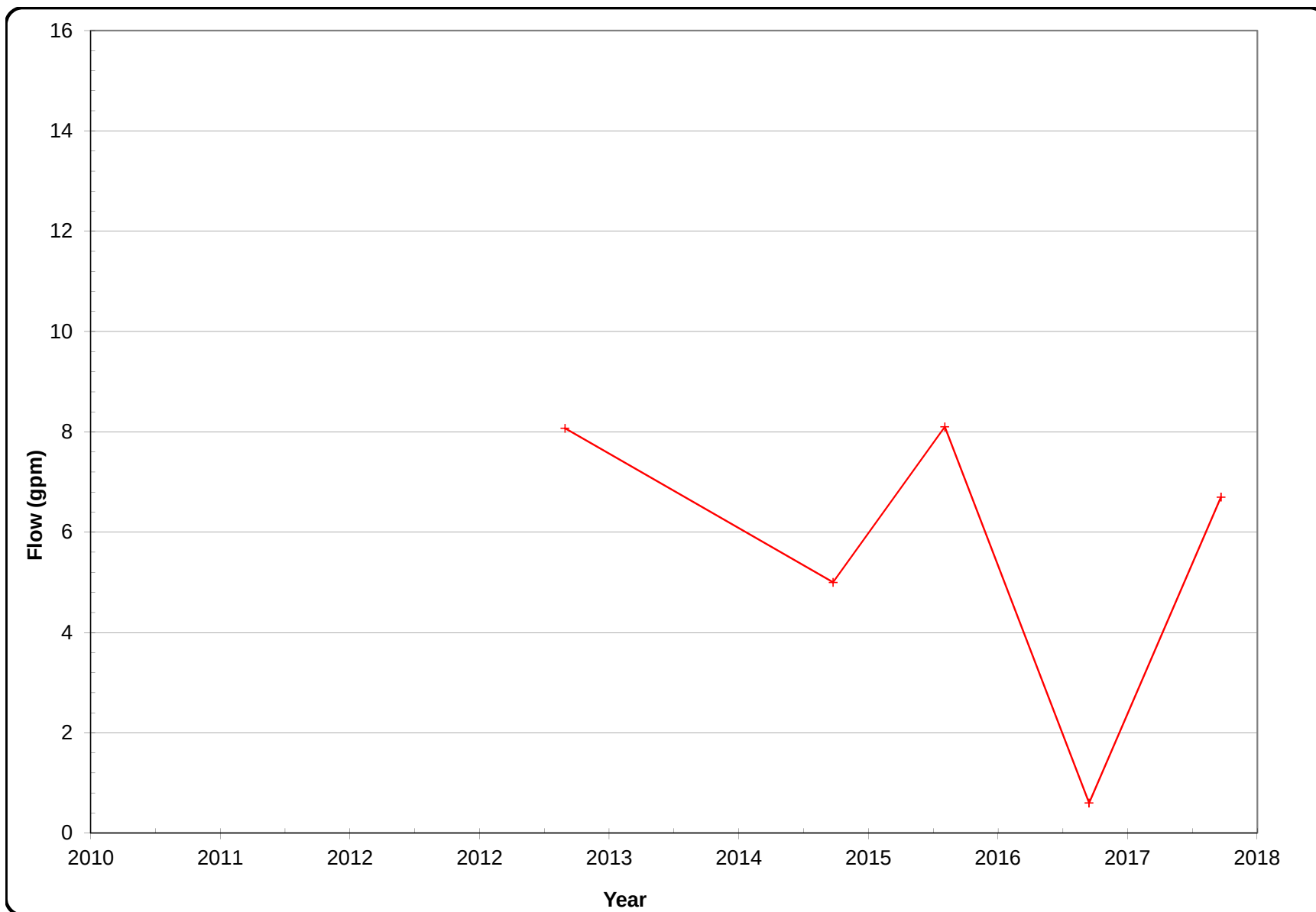
Hydrometrics, Inc.
Consulting Scientists and Engineers

SP-6 Hydrograph
Black Butte Copper Project
Meagher County, Montana



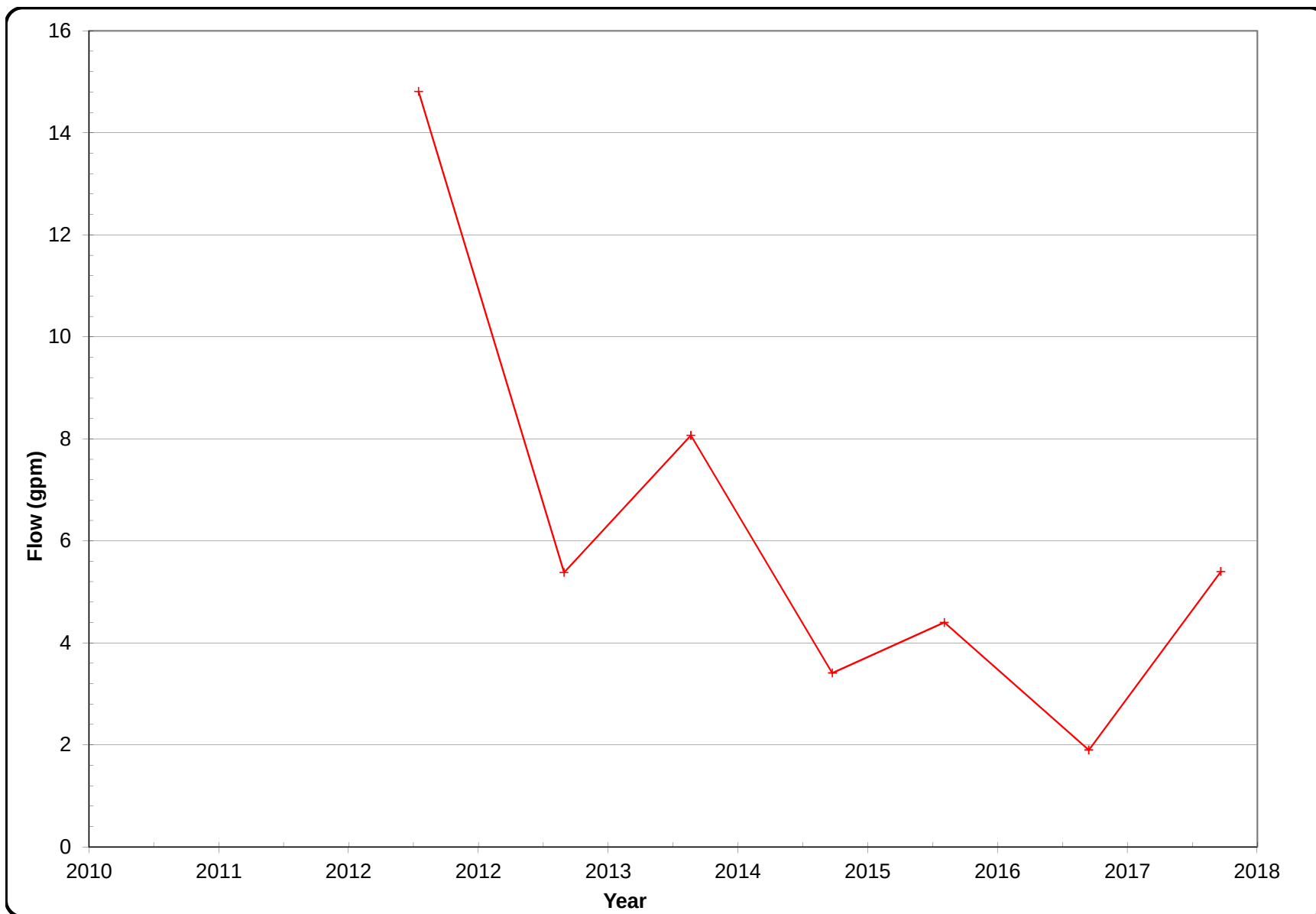
Hydrometrics, Inc.
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SP-7 Hydrograph
Black Butte Copper Project
Meagher County, Montana



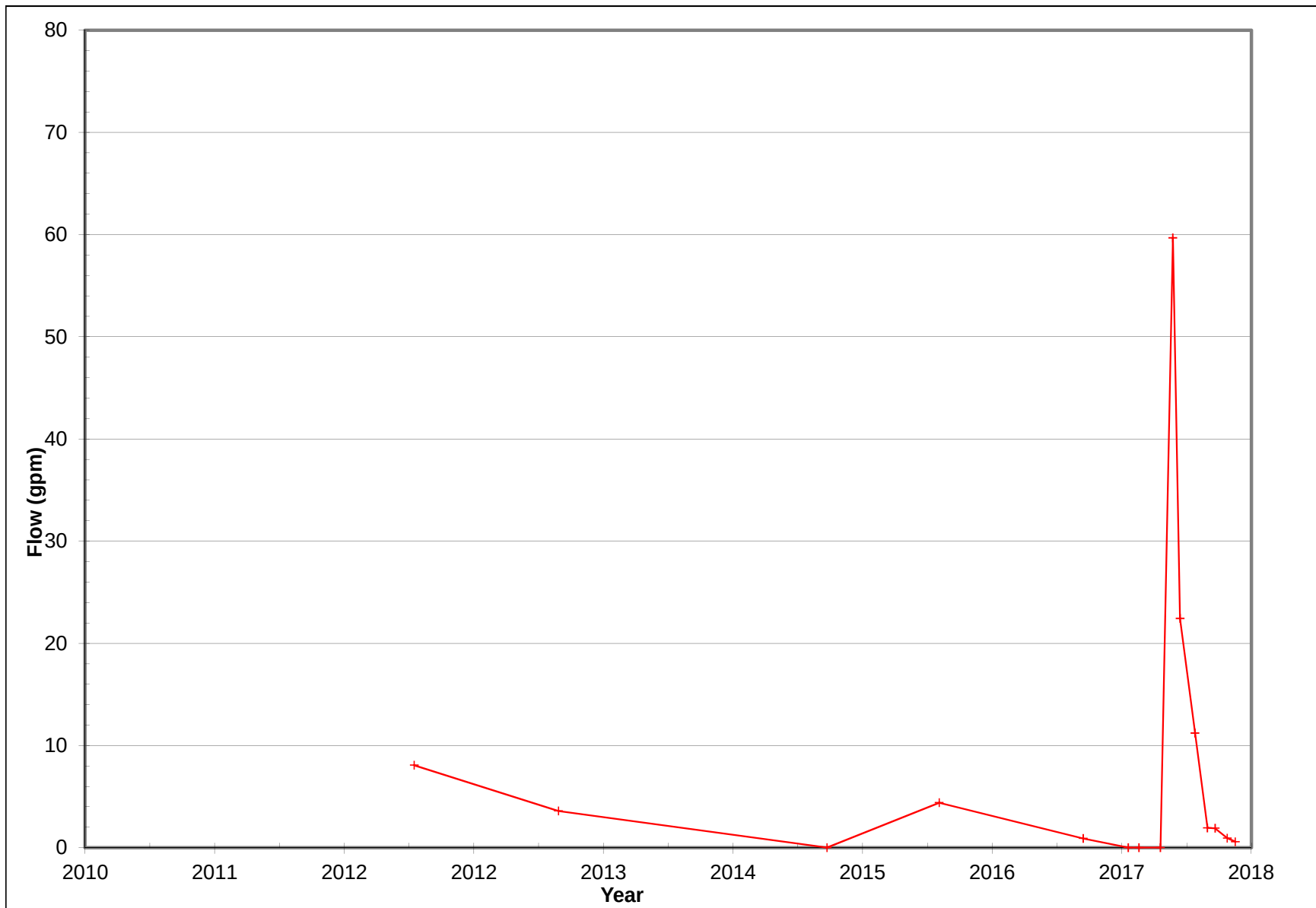
Hydrometrics, Inc.
Consulting Scientists and Engineers

**SP-8 Hydrograph
Black Butte Copper Project
Meagher County, Montana**



Hydrometrics, Inc.
Consulting Scientists and Engineers

**SP-9 Hydrograph
Black Butte Copper Project
Meagher County, Montana**

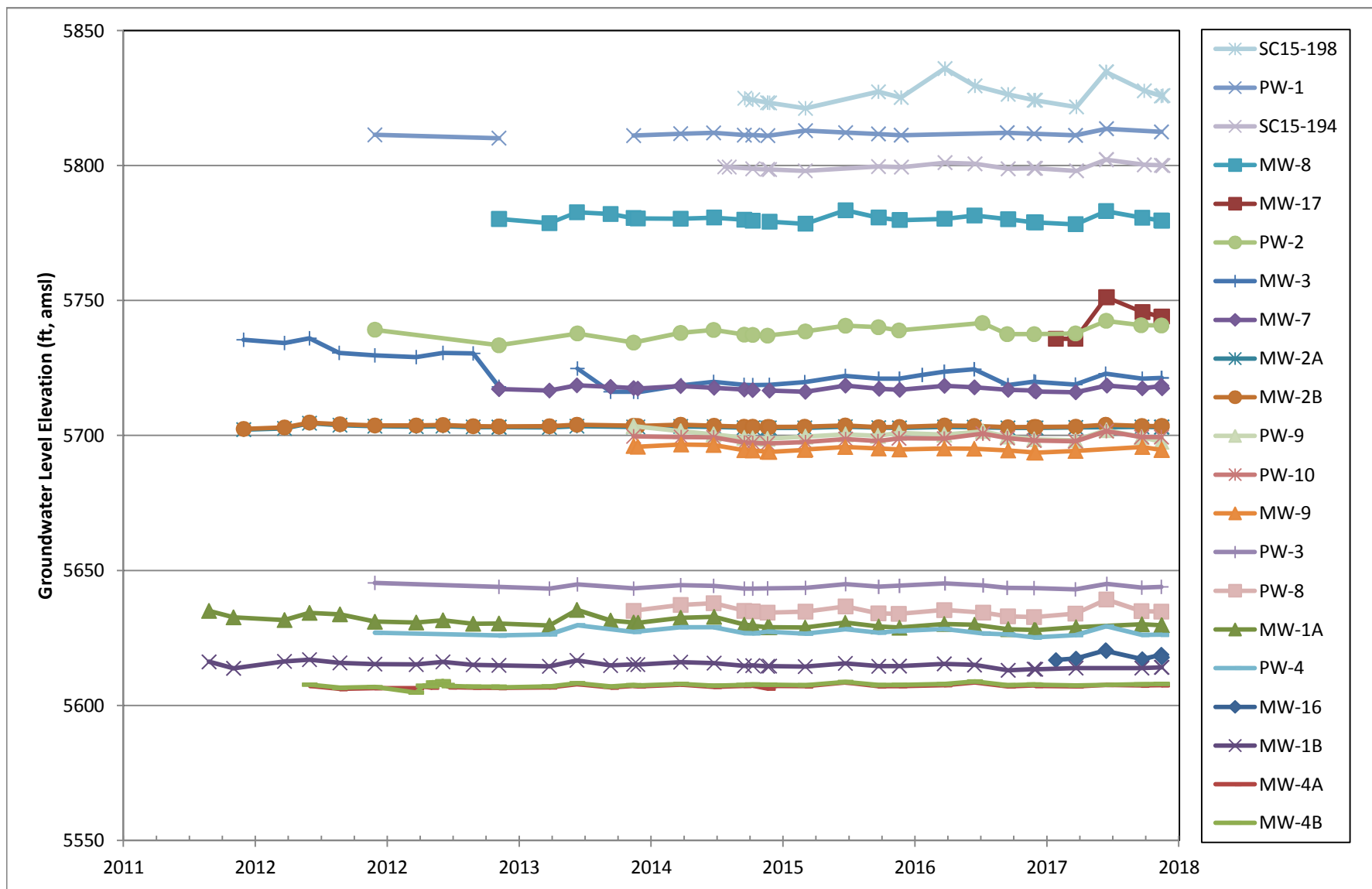


Hydrometrics, Inc.
Consulting Scientists and Engineers

**SP-10 Hydrograph
Black Butte Copper Project
Meagher County, Montana**

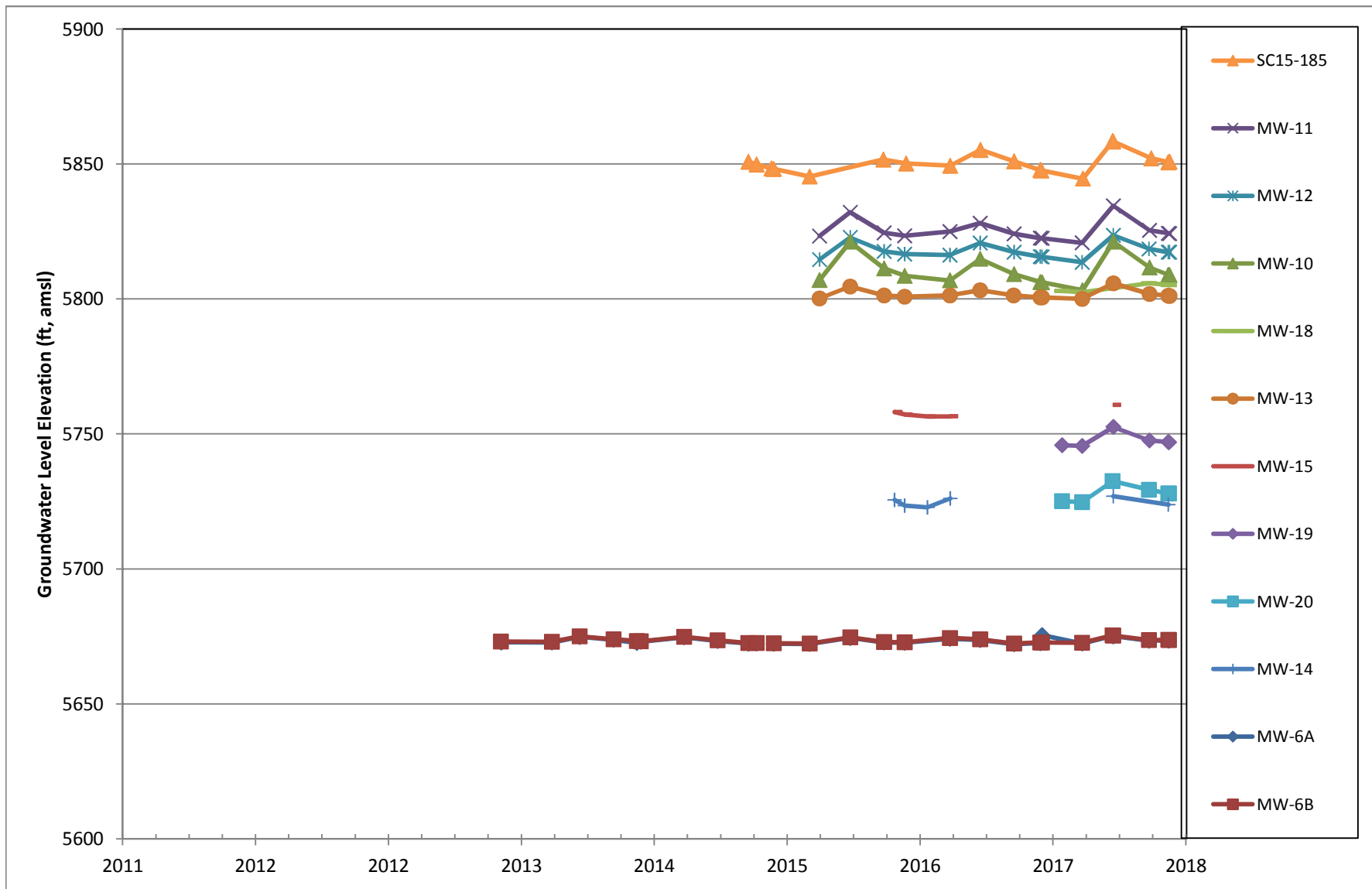
APPENDIX A2

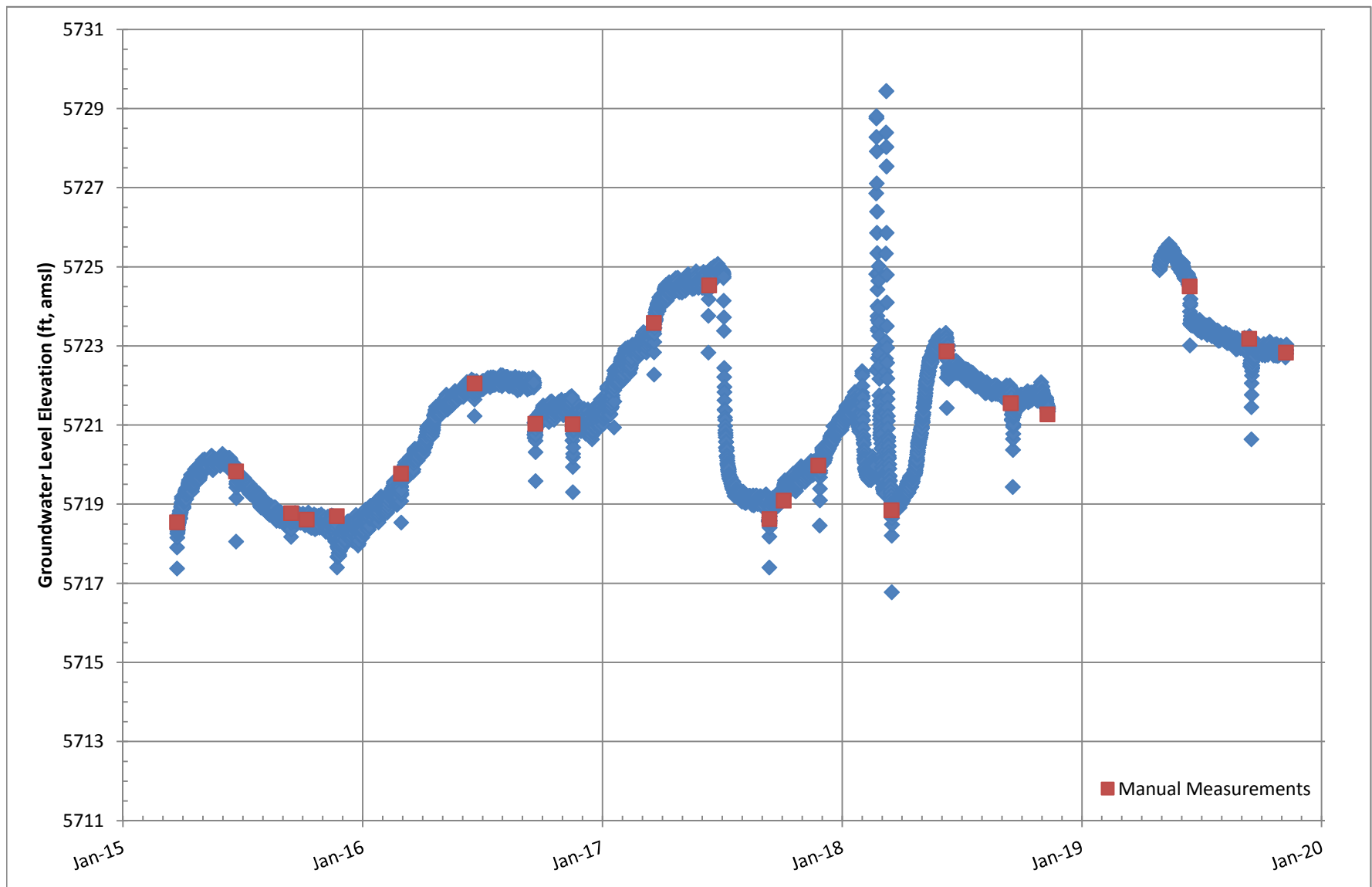
GROUNDWATER HYDROGRAPHS

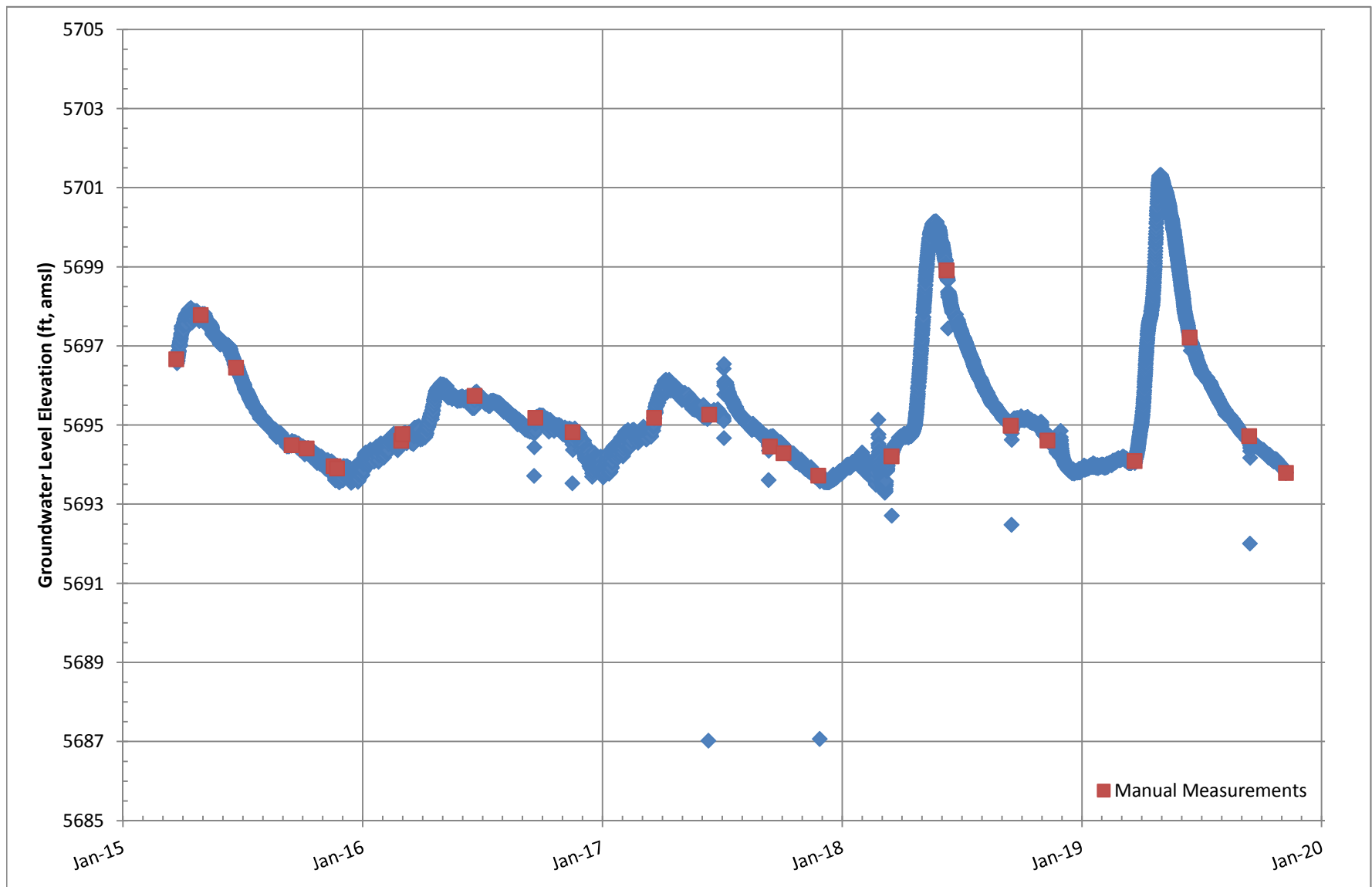


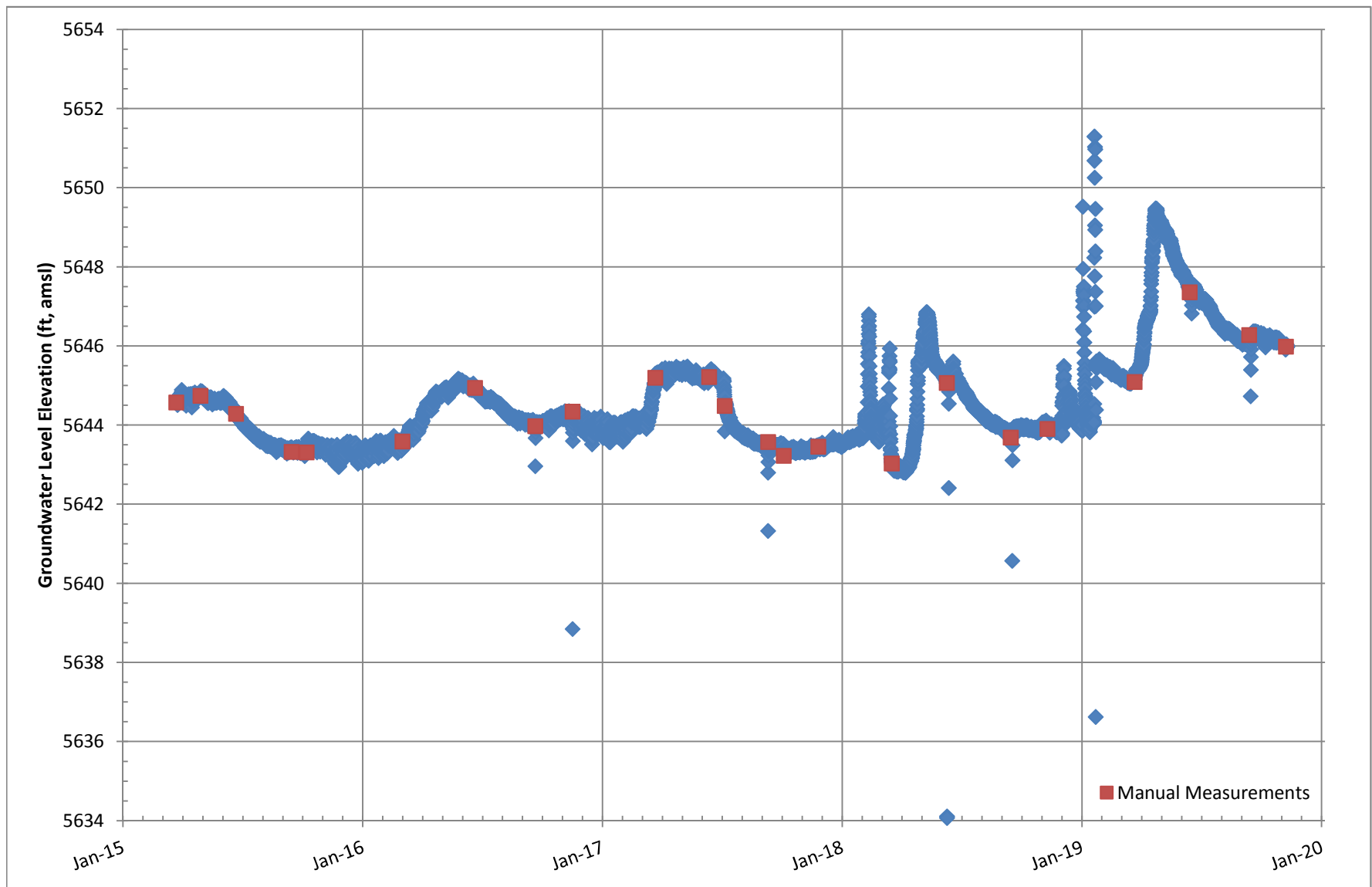
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Consulting Scientists and Engineers

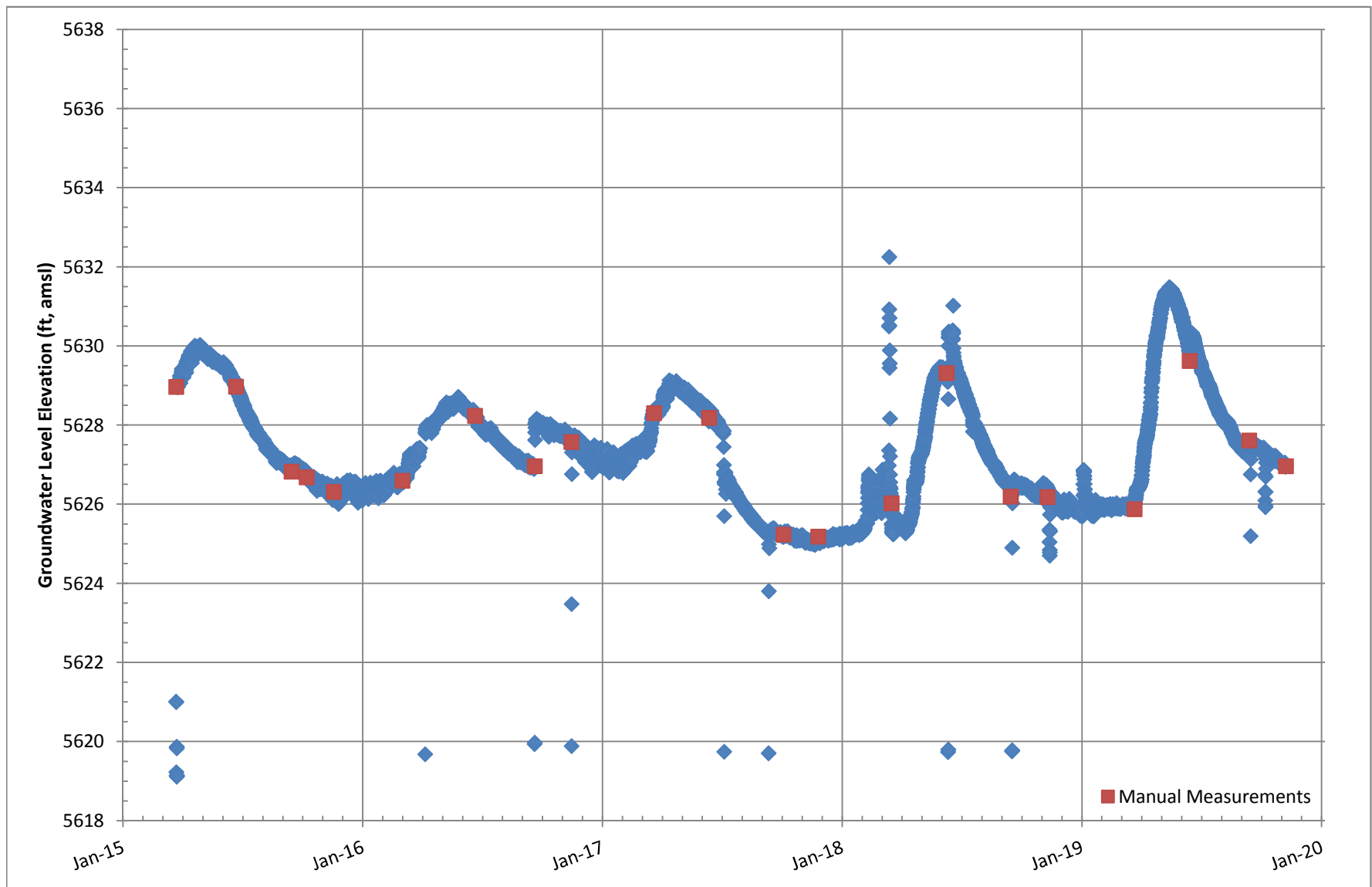
Appendix A2
Monitoring Well Hydrographs
Black Butte Copper Project
Meagher County, Montana

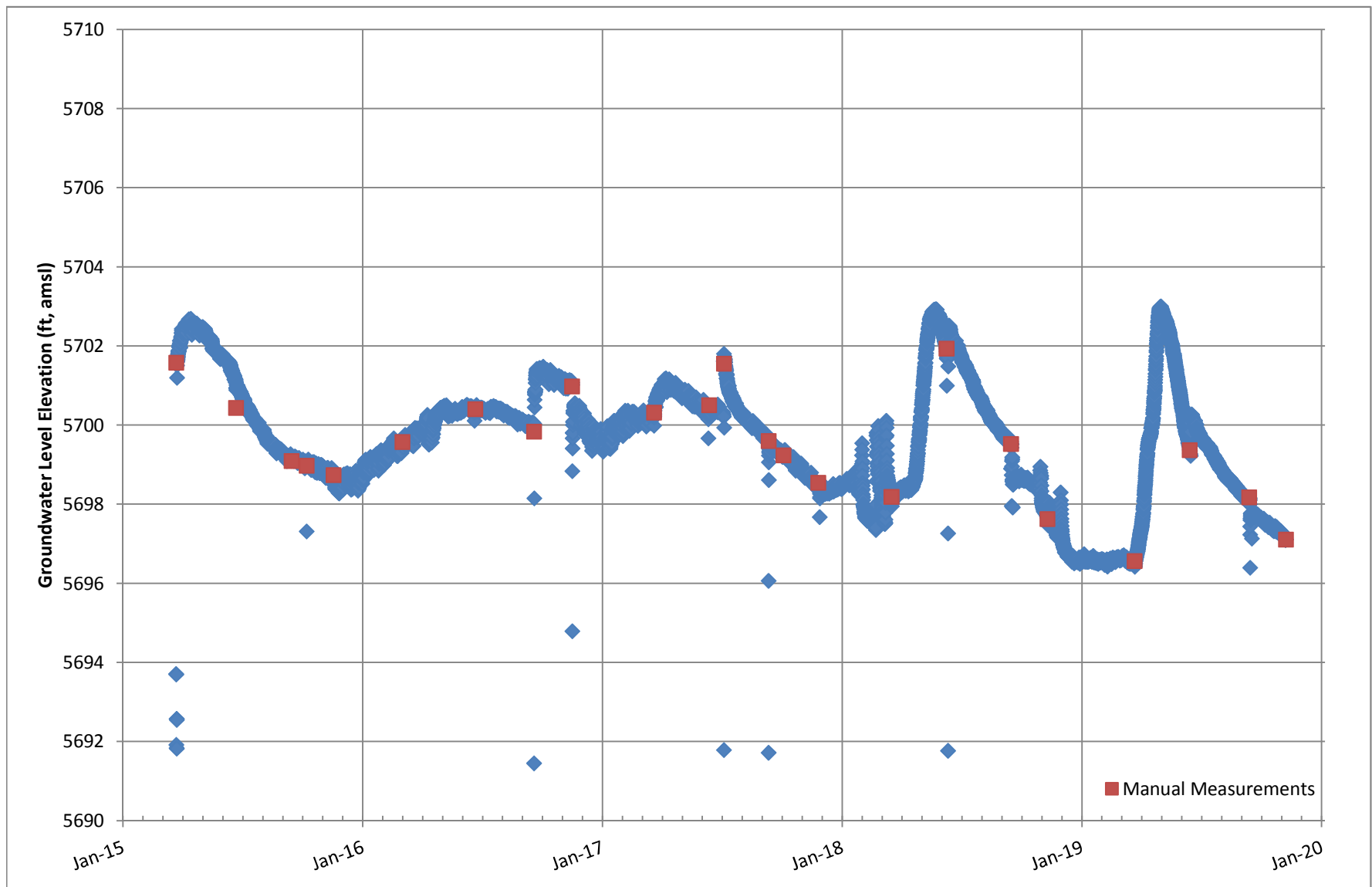


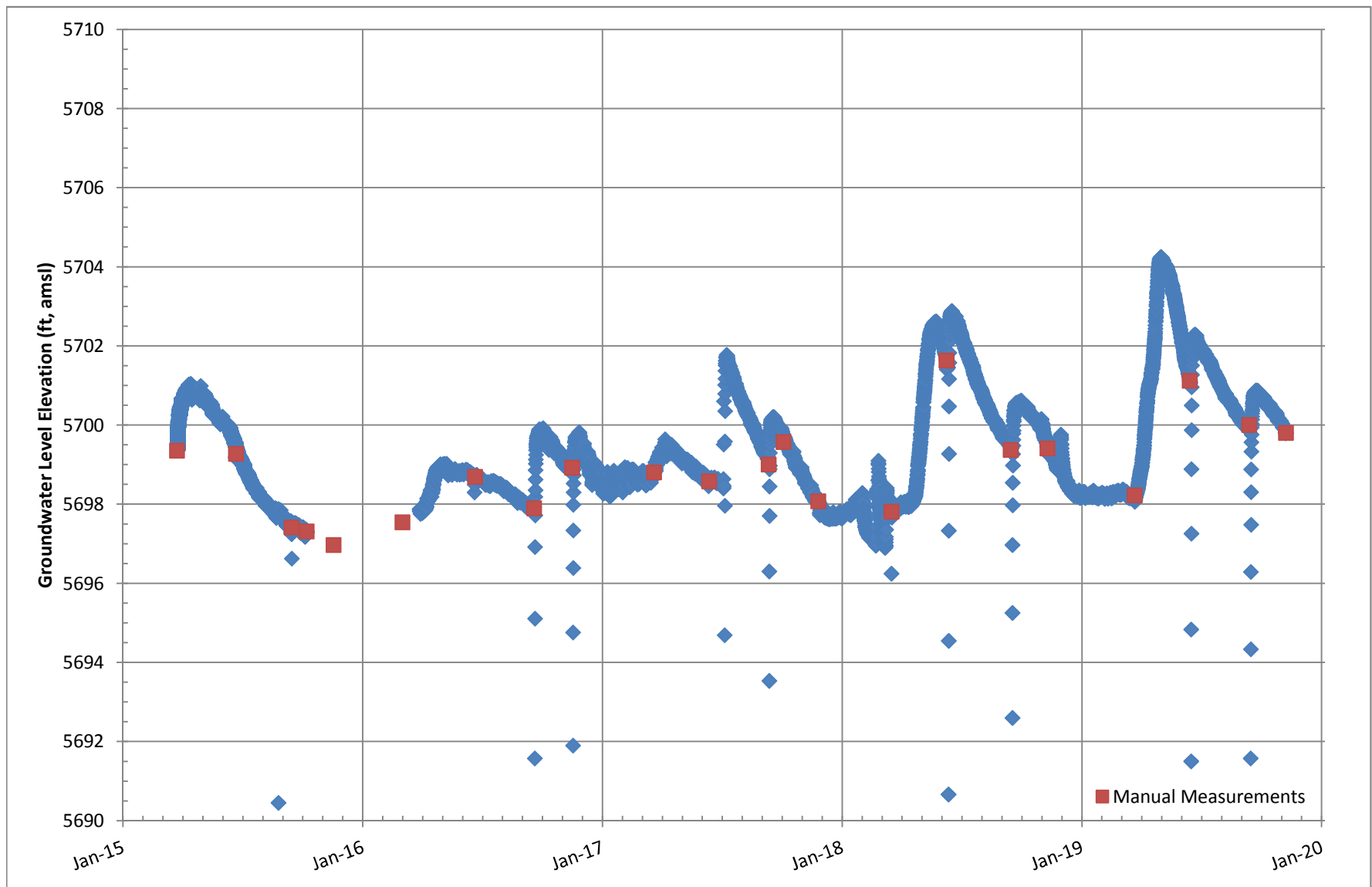












APPENDIX A2. 2018 WATER LEVEL DATA SUMMARY

Well Name	Easting	Northing	Measuring Point Elev.	2018 Water Level Elevation			
	WGS 1984 UTM Zone 12 North			March	June	September	November
	meters						
Monitoring Wells							
MW-1A	506935.22	5180841.55	5637.73	5628.86	5634.20	5630.16	5629.70
MW-1B	506934.19	5180845.46	5637.90	5613.94	5615.99	5611.97	5614.10
MW-2A	506598.18	5180331.93	5745.31	5702.99	5703.43	5703.15	5703.10
MW-2B	506596.96	5180328.73	5745.53	5703.35	5703.94	5703.48	5703.44
MW-3	506484.07	5180740.22	5762.17	5718.85	5722.86	5721.55	5721.27
MW-4A	507201.47	5180855.43	5612.12	5607.01	5607.62	5607.43	5607.53
MW-4B	507200.12	5180858.49	5612.07	5607.47	5608.06	5607.89	5607.99
MW-6A	507809.18	5179492.90	5681.87	5672.42	5675.18	5673.42	5673.53
MW-6B	507792.76	5179490.70	5685.31	5672.70	5675.44	5673.67	5673.78
MW-7	507451.70	5179500.70	5749.46	5715.91	5718.43	5717.45	5718.33
MW-8	507036.00	5179398.30	5810.93	5778.19	5783.05	5780.73	5779.63
MW-9	5180725.46	506592.96	5745.80	5694.21	5698.91	5694.98	5694.61
MW-10	506578.57	5179215.05	5886.11	5803.27	5821.19	5811.90	5808.93
MW-11	506464.72	5179117.47	5857.86	5830.81	5834.48	5825.61	5824.28
MW-12	506412.82	5179010.38	5844.75	5813.61	5823.56	5818.60	5817.29
MW-13	506477.79	5178855.81	5822.48	5799.98	5805.80	5801.86	5801.18
MW-14	508255.63	5179376.77	5763.87	--	5726.90	5724.28	5723.80
MW-15	508290.89	5179071.07	5797.34	--	5760.72	5758.18	--
MW-16	507036.301	5180586.210	5625.59	5617.38	5620.42	5617.10	5618.81
MW-17	506654.57	5180130.74	5796.06	5735.76	5751.15	5745.75	5743.95
MW-18	506257.38	5179707.93	5821.97	5802.50	5811.84	5805.77	5805.20
MW-19	506878.42	5178925.74	5761.07	5745.53	5752.56	5747.57	5746.98
MW-20	507426.69	5179631.58	5750.62	5724.69	5732.50	5729.36	5727.92
SC12-116	507030.00	5180380.00	5793.89	--	5691.42	5693.39	5691.61
SC15-184	507045.30	5178968.70	5745.56	--	--	--	--
SC15-185	506355.52	5179091.15	5881.72	5844.51	5858.44	5852.59	5850.64
SC15-194	506025.67	5179847.22	5819.82	5797.97	5802.20	5800.16	5800.05
SC15-198	506594.08	5179743.42	5867.60	5821.70	5834.74	5828.07	5825.72
Test Wells							
PW-1	506301.42	5180698.40	5913.74	5811.16	5813.58	5812.72	5812.46
PW-2	506443.15	5180865.00	5794.88	5737.76	5742.44	5740.87	5740.73
PW-3	506846.43	5180479.42	5657.42	5643.03	5645.06	5643.68	5643.90
PW-4	506901.79	5180688.26	5680.01	5626.02	5629.31	5626.19	5626.18
PW-5	5181172.77	506490.68	5915.49	5563.16	5569.33	5576.13	5579.89
PW-6N	5181085.67	506477.44	5897.40	--	5591.02	5590.60	5589.93
PW-7	5180867.59	507122.89	5611.15	--	--	--	--
PW-8	5180695.53	506846.19	5680.60	5634.05	5639.26	5634.96	5634.74
PW-9	5180721.88	506598.38	5745.05	5698.18	5701.93	5699.52	5697.62
PW-10	5180721.88	506593.55	5744.84	5697.81	5701.63	5699.37	5699.41
Piezometers							
PZ-01	507650	5180256	5630.34	5627.13	5627.65	5627.09	5627.35
PZ-02	507400.7	5180779	5613.51	5610.23	5610.50	5610.23	5610.47
PZ-03	507249.2	5180619	5617.74	5612.71	5612.71	5612.25	5612.76
PZ-04	506991.7	5181111	5602.7	--	5601.36	5595.13	--
PZ-05	507080	5181215	5599.79	--	5596.71	5596.42	5596.59
PZ-07A	506258.39	5180074.65	5777.5	--	5775.77	5771.75	5775.53
PZ-07B	506258.47	5180075	5777.59	5771.83	5775.25	--	5774.30
PZ-08	507090.31	5180573.81	5621.29	5615.46	5618.74	5615.30	5616.81
PZ-09	507883.78	5180178.58	5637.27	5631.44	5633.02	5631.70	5631.85
PZ-10	506589.19	5180672.48	5727.42	--	5717.81	5718.79	5718.20
PZ-11R	507031.15	5180654.89	5622.24	5613.68	5615.52	5615.67	5615.44
PZ-12	506844.43	5180513.76	5646.55	--	5641.41	5640.98	5640.94
PZ-13	507793.883	5180289.381	5637.27	--	5629.26	5628.48	5628.72
PZ-14	507492.906	5180412.125	5625.68	--	5619.59	5619.19	5619.66
PZ-15	507193.654	5180762.848	5614.45	--	5609.71	5609.30	5609.61

¹ amsl: above mean sea level; bmp: below measuring point; bfs: below ground surface

APPENDIX B

SURFACE WATER QUALITY DATA SUMMARY AND TREND GRAPHS

Station Name	Reporting Units	Aquatic Life Standard Chronic*	Human Health Standard Surface water	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-2	SW-2	SW-2	
Sample Date				1/17/18 12:45	2/16/18 12:00	3/20/18 14:10	3/20/18 14:30	4/12/18 13:00	4/12/18 13:30	5/24/18 10:40	6/11/18 13:15	7/24/18 10:30	7/24/18 10:50	8/28/18 10:45	9/17/18 15:20	10/23/18 11:30	11/12/18 12:00	12/14/18 08:40	1/17/18 11:00	2/16/18 09:45	3/19/18 11:35	
Sample ID				BBC-1801-105	BBC-1802-107	BBC-1803-120	BBC-1803-121	BBC-1804-104	BBC-1804-105	BBC-1805-116	BBC-1806-100	BBC-1807-100	BBC-1807-101	BBC-1808-100	BBC-1809-100	BBC-1810-100	BBC-1811-100	BBC-1812-100	BBC-1801-100	BBC-1802-102	BBC-1803-100	
Lab Name				Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks								Duplicate		Duplicate				Duplicate								
Lab Sample ID				H18010282-006	H18020280-007	H18030350-007	H18030350-008	H18040276-004	H18040276-005	H18050618-003	H18060369-001	H18070561-001	H18070561-002	H18080619-001	H18090466-001	H18100607-001	H18110265-001	H18120294-001	H18010282-001	H18020280-002	H18030350-001	
Field Parameters																						
Dissolved Oxygen	mg/L	--	--	12.03	10.44	13.23	--	13.97	--	10.6	10.83	9.31	--	10.6	9.41	12.13	11.7	10.9	11.15	11.47	12.52	
Field pH	s.u.	--	--	8.23	8.24	7.96	--	8.33	--	8	7.69	7.8	--	7.81	8.63	6.62	7.9	7.35	7.99	7.97	7.81	
Field Specific Conductivity	umhos/cm	--	--	351	321	320	--	321	--	196	300	327	--	301	302	331	334	343	316	336	323	
Flow	Cubic Ft Sec	--	--	NF-ICE	NF-ICE	NM-ICE	--	NM-ICE	--	247.6	73.17	25.69	--	16.29	13.02	18.7	NM-ICE	NM-ICE	NF-ICE	NF-ICE	NM-ICE	
Staff Gauge	Feet	--	--	--	--	--	--	--	--	--	1.34	0.9	--	0.8	0.73	0.83	--	--	--	--	--	
Water Temperature	Deg C	--	--	0.04	3.3	-0.3	--	1.3	--	5.7	7.9	11.9	--	7.6	14.5	1.4	0.25	0.15	0.5	0.13	-0.5	
Physical Parameters																						
Total Dissolved Solids	mg/L	--	--	186 D	193 D	183	183	180 D	182 D	122 D	175 D	197 D	187 D	176 D	190 D	193 D	193 D	173 D	184 D	185 D	173	
Total Suspended Solids	mg/L	--	--	4	<4	16	16	<4	<4	10	8	<4	<4	<4	6	<4	<4	<4	<4	<4	<4	
Major Constituents - Commons Ions																						
Alkalinity as CaCO3	mg/L	--	--	170	170	170	160	160	160	98	150	180	170	160	160	170	180	170	170	160	170	
Calcium (DIS)	mg/L	--	--	49	50	46	47	45	45	29	46	48	49	42	44	48	49	50	49	50	49	
Chloride	mg/L	--	--	1	1	2	2	2	2	1	2	1	1	1	1	2	2	2	1	1	1	
Fluoride	mg/L	--	4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Hardness as CaCO3	mg/L	--	--	173	178	166	167	162	161	100	164	175	175	153	160	173	179	178	172	176	175	
Magnesium (DIS)	mg/L	--	--	13	13	12	12	12	12	7	12	13	13	11	12	13	14	13	12	13	12	
Potassium (DIS)	mg/L	--	--	1	1	2	2	2	2	1	1	1	1	1	2	1	1	1	1	1	1	
Sodium (DIS)	mg/L	--	--	2	2	2	2	3	3	2	2	3	3	2	2	2	3	2	2	2	2	
Sulfate	mg/L	--	--	7	7	7	7	7	7	3	5	5	5	6	6	7	8	7	7	7	6	
Nutrients																						
Nitrate + Nitrite as N	mg/L	--	10	0.12	0.12	0.05	0.06	0.01	0.01	<0.01	0.02	0.02	0.02	<0.01	<0.01	<0.01	0.04	0.11	0.1	0.1	0.07	
Phosphorus (TOT)	mg/L	--	--	0.011	0.007	0.018	0.021	0.012	0.018	0.018	0.008	0.014	0.015	0.008 J	0.013 J	0.006	0.007	0.01	0.006	0.006	0.006	
Total Persulfate Nitrogen	mg/L	--	--	--	--	--	--	0.18	0.19	0.15	0.1	0.16	0.15	0.11 J	0.14	0.07	0.1	0.18	--	--	--	
Metals - Trace Constituents																						
Aluminum (DIS)	mg/L	0.087	--	<0.009	<0.009	<0.009	<0.009	0.016	0.019	0.051	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	0.01	<0.009	0.01	
Antimony (TRC)	mg/L	--	0.0056	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Arsenic (TRC)	mg/L	0.15	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Barium (TRC)	mg/L	--	1	0.109	0.11	0.106	0.105	0.102	0.105	0.084	0.094	0.12	0.119	0.102	0.111	0.101	0.11	0.116	0.095	0.098	0.091	
Beryllium (TRC)	mg/L	--	0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	
Cadmium (TRC)	mg/L	0.00026	0.005	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	
Chromium (TRC)	mg/L	--	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobalt (TRC)	mg/L	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Copper (TRC)	mg/L	0.0029	1.3	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Iron (TRC)	mg/L	1	--	0.19	0.12	0.46	0.45	0.22	0.23	0.41	0.26	0.12	0.12	0.14 J	0.18	0.12	0.15	0.17	0.13	0.13	0.14	
Lead (TRC)	mg/L	0.00054	0.015	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Manganese (TRC)	mg/L	--	--	0.021	0.012	0.051	0.051	0.02	0.019	0.012	0.017	0.017	0.016	0.015	0.019	0.012	0.014	0.017	0.008	0.007	0.007	
Mercury (TRC)	mg/L	0.00091	0.00005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	
Mercury (TRC)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.005	--	--	--	
Molybdenum (TRC)	mg/L	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Nickel (TRC)	mg/L	0.016	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	
Selenium (TRC)	mg/L	0.005	0.05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Silver (TRC)	mg/L	--	0.1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Strontium (TRC)	mg/L	--	4	0.127	0.13	0.119	0.118	0.113	0.116	0.0923 D	0.126 D	0.129 D	0.128 D	0.115 D	0.116 D	0.131 D	0.136 D	0.137 D	0.129	0.131	0.119	
Thallium (TRC)	mg/L	--	0.00024	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.002	<0.0002	<0.0002	<0.0002	
Uranium (TRC)	mg/L	--	0.03	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0004	<0.008	<0.008	<0.008	
Zinc (TRC)	mg/L	0.037	2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	0.002	0.002 J	0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

Aquatic Life Standard Chronic*

Human Health Standard Surface water

*Calculated @ 25mg/L Hardness

Source:
Montana DEQ-7 May 2017
Montana DEQ-7 May 2017

Station Name	Reporting Units	Aquatic Life Standard Chronic*	Human Health Standard Surface water	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
Sample Date				4/12/18 10:55	5/24/18 09:50	6/11/18 14:15	7/24/18 11:35	8/28/18 11:25	9/17/18 16:00	10/23/18 12:15	11/12/18 12:45	12/14/18 09:45	12/14/18 10:00	3/19/18 12:40	4/12/18 12:30	5/24/18 12:30	5/24/18 12:45	6/11/18 15:40	7/24/18 13:35	8/28/18 13:40	9/17/18 17:15
Sample ID				BBC-1804-100	BBC-1805-114	BBC-1806-101	BBC-1807-102	BBC-1808-101	BBC-1809-101	BBC-1810-101	BBC-1811-101	BBC-1812-104	BBC-1812-105	BBC-1803-104	BBC-1804-103	BBC-1805-118	BBC-1805-119	BBC-1806-103	BBC-1807-105	BBC-1808-106	BBC-1809-104
Lab Name				Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks													Duplicate	No Sample	No Sample		Duplicate				
Lab Sample ID				H18040276-001	H18050618-001	H18060369-002	H18070561-003	H18080619-002	H18090466-002	H18100607-002	H18110265-002	H18120294-004	H18120294-005	z	z	H18050618-005	H18050618-006	H18060369-004	H18070561-006	H18080619-007	H18090466-005
Field Parameters																					
Dissolved Oxygen	mg/L	--	--	14.2	10.96	11.33	9.18	10.4	9.45	11.72	11.56	10.23	--	--	--	9.41	--	10.32	9.01	9.3	8.95
Field pH	s.u.	--	--	8.2	7.55	7.35	7.52	8.23	8.57	7.79	8.16	7.66	--	--	--	8.13	--	8.16	8.32	8.33	8.42
Field Specific Conductivity	umhos/cm	--	--	311	189	286	333	282	292	320	326	335	--	--	--	356	--	383	407	415	423
Flow	Cubic Ft Sec	--	--	NM-ICE	NM	69.04	11.73	11.8	9.43	15.68	NM-ICE	NM-ICE	--	NF-ICE	NM-ICE	0.6	--	0.47	0.14	0.13	0.07
Staff Gauge	Feet	--	--	--	--	0.8	0.29	0.31	0.3	0.41	--	--	--	--	--	--	--	0.34	0.24	0.18	0.15
Water Temperature	Deg C	--	--	0.2	4.4	5.9	12.9	7.6	12.5	2.3	0.14	0.13	--	--	--	9.6	--	8.4	11.5	8.3	10.2
Physical Parameters																					
Total Dissolved Solids	mg/L	--	--	173 D	115 D	165 D	188 D	159 D	173 D	184 D	184 D	171 D	169 D	--	--	211 D	212 D	243 D	229 D	238 D	255 D
Total Suspended Solids	mg/L	--	--	4	13	6	<4	<4	<4	<4	<4	<4	<4	--	--	<4	<4	<4	<4	8 J	6
Major Constituents - Commons Ions																					
Alkalinity as CaCO3	mg/L	--	--	150	94	150	180	150	150	170	170	170	170	--	--	180	170	190	210	210	210
Calcium (DIS)	mg/L	--	--	45	27	46	50	42	44	50	48	47	50	--	--	44	43	49	50	49	52
Chloride	mg/L	--	--	3	<1	1	2	1	1	1	2	1	1	--	--	2	2	2	2	2	2
Fluoride	mg/L	--	4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	0.2	0.2	0.2	0.2	0.2	0.2
Hardness as CaCO3	mg/L	--	--	159	96	160	177	149	155	177	172	167	177	--	--	191	190	220	223	222	234
Magnesium (DIS)	mg/L	--	--	11	7	11	13	11	11	13	13	12	12	--	--	20	20	24	24	24	25
Potassium (DIS)	mg/L	--	--	1	<1	1	1	1	1	1	1	1	1	--	--	<1	<1	1	<1	1	1
Sodium (DIS)	mg/L	--	--	2	1	2	2	2	2	2	2	2	2	--	--	2	2	2	2	2	2
Sulfate	mg/L	--	--	6	3	4	6	5	5	7	7	7	7	--	--	16	16	17	17	21	21
Nutrients																					
Nitrate + Nitrite as N	mg/L	--	10	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.03	0.1	0.1	--	--	<0.01	<0.01	0.05	0.05	0.06	0.03
Phosphorus (TOT)	mg/L	--	--	<0.003	0.018	0.008	0.009	0.006 J	0.008 J	<0.003	0.005	0.007	0.009	--	--	0.008	0.007	0.011	0.014	0.012 J	0.017 J
Total Persulfate Nitrogen	mg/L	--	--	0.11	0.13	<0.04	0.08	0.07 J	0.1	0.06	0.09	0.14	0.14	--	--	0.15	0.15	0.6	0.13	0.17 J	0.12
Metals - Trace Constituents																					
Aluminum (DIS)	mg/L	0.087	--	0.022	0.046	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	--	--	0.018	<0.009	<0.009	<0.009	<0.009	<0.009
Antimony (TRC)	mg/L	--	0.0056	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (TRC)	mg/L	0.15	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium (TRC)	mg/L	--	1	0.092	0.077	0.079	0.108	0.096	0.106	0.088	0.096	0.095	0.098	--	--	0.126	0.125	0.146	0.16	0.153	0.166
Beryllium (TRC)	mg/L	--	0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Cadmium (TRC)	mg/L	0.00026	0.005	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--	--	<0.00003	0.00005	<0.00003	<0.00003	<0.00003	<0.00003
Chromium (TRC)	mg/L	--	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt (TRC)	mg/L	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper (TRC)	mg/L	0.0029	1.3	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron (TRC)	mg/L	1	--	0.3	0.47	0.24	0.1	0.12 J	0.13	0.1	0.12	0.11	0.12	--	--	0.07	0.06	0.15	0.17	0.1 J	0.2
Lead (TRC)	mg/L	0.00054	0.015	<0.0003	0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	<0.0003	<0.0003	<0.0003	0.0003	<0.0003	0.0005
Manganese (TRC)	mg/L	--	--	0.015	0.011	0.011	0.012	0.009	0.009	0.006	0.007	0.008	0.008	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	0.007
Mercury (TRC)	mg/L	0.00091	0.00005	<0.000005	0.000007	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	--	--	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Mercury (TRC)	ug/L	--	--	--	--	--	--	--	--	--	--	<0.005	<0.005	--	--	--	--	--	--	--	--
Molybdenum (TRC)	mg/L	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (TRC)	mg/L	0.016	0.1	<0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (TRC)	mg/L	0.005	0.05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silver (TRC)	mg/L	--	0.1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Strontium (TRC)	mg/L	--	4	0.114	0.0928 D	0.132 D	0.137 D	0.114 D	0.117 D	0.131 D	0.132 D	0.128 D	0.131 D	--	--	0.1 D	0.0995 D	0.11 D	0.119 D	0.116 D	0.12 D
Thallium (TRC)	mg/L	--	0.00024	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.002	<0.002	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Uranium (TRC)	mg/L	--	0.03	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0003	0.0003	--	--	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Zinc (TRC)	mg/L	0.037	2	<0.002	<0.003	0.003	0.003	<0.002	<0.002	<0.002	<0.002	0.002	0.003	--	--	<0.002	<0.002	0.003	0.003	0.002 J	0.003

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Aquatic Life Standard Chronic*
	Human Health Standard Surface water

*Calculated @ 25mg/L Hardness

Station Name	Reporting Units	Aquatic Life Standard Chronic*	Human Health Standard Surface water	SW-3	SW-3	SW-3	SW-4	SW-4	SW-4	SW-4	SW-5	SW-5	SW-5	SW-5	SW-6	SW-6	SW-6	SW-6	SW-6	SW-8	SW-8
Sample Date				10/23/18 14:10	11/12/18 14:30	12/14/18 09:10	3/19/18 12:50	6/11/18 16:10	9/17/18 17:30	11/12/18 14:40	3/20/18 15:20	6/11/18 17:15	9/18/18 09:05	11/12/18 15:45	3/20/18 10:00	6/12/18 11:30	6/12/18 11:50	9/18/18 12:30	11/14/18 13:00	3/20/18 09:10	6/11/18 17:45
Sample ID				BBC-1810-105	BBC-1811-107	BBC-1812-102	BBC-1803-106	BBC-1806-105	BBC-1809-105	BBC-1811-108	BBC-1803-123	BBC-1806-108	BBC-1809-106	BBC-1811-112	BBC-1803-113	BBC-1806-112	BBC-1806-113	BBC-1809-112	BBC-1811-115	BBC-1803-112	BBC-1806-109
Lab Name				Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	HYDRO
Remarks						No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample			Duplicate			No Sample	No Sample
Lab Sample ID				H18100607-006	H18110265-007	z	z	z	z	z	z	z	z	z	H18030350-005	H18060369-007	H18060369-008	H18090466-007	H18110401-001	z	z
Field Parameters																					
Dissolved Oxygen	mg/L	--	--	10.62	10.9	--	11.24	8.84	8.18	--	--	--	--	--	11.81	9.43	--	9.06	10.8	11.94	9.32
Field pH	s.u.	--	--	7.92	8.32	--	8.18	7.77	8.22	--	--	--	--	--	7.15	7.75	--	8.26	8.35	7.18	7.86
Field Specific Conductivity	umhos/cm	--	--	415	398	--	362	368	376	--	--	--	--	--	421	390	--	424	388	163	395
Flow	Cubic Ft Sec	--	--	0.09	NM-ICE	NF-DRY	NM-ICE	0.16	0.15	NM-ICE	NF-DRY	NF-DRY	NF-DRY	NM-DRY	NM-ICE	0.53	--	0.15	NM-ICE	NM-ICE	1.82
Staff Gauge	Feet	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.41
Water Temperature	Deg C	--	--	3.8	0.62	--	0.47	8.2	10.8	--	--	--	--	--	1.1	8.7	--	10.1	2.2	NM	10.1
Physical Parameters																					
Total Dissolved Solids	mg/L	--	--	230 D	223 D	--	--	--	--	--	--	--	--	--	229	228 D	224 D	246 D	225 D	--	--
Total Suspended Solids	mg/L	--	--	<4	<4	--	--	--	--	--	--	--	--	--	4	80 D	89 D	7	6 J	--	--
Major Constituents - Commons Ions																					
Alkalinity as CaCO3	mg/L	--	--	200	200	--	--	--	--	--	--	--	--	--	220	200	200	220	210	--	--
Calcium (DIS)	mg/L	--	--	49	47	--	--	--	--	--	--	--	--	--	50	52	50	54	52	--	--
Chloride	mg/L	--	--	2	3	--	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	--	--
Fluoride	mg/L	--	4	0.2	0.1	--	--	--	--	--	--	--	--	--	0.1	0.2	0.2	0.2	0.2	--	--
Hardness as CaCO3	mg/L	--	--	221	219	--	--	--	--	--	--	--	--	--	216	217	210	232	224	--	--
Magnesium (DIS)	mg/L	--	--	24	25	--	--	--	--	--	--	--	--	--	22	21	21	24	23	--	--
Potassium (DIS)	mg/L	--	--	1	1	--	--	--	--	--	--	--	--	--	1	<1	<1	1	1	--	--
Sodium (DIS)	mg/L	--	--	2	2	--	--	--	--	--	--	--	--	--	3	3	3	3	3	--	--
Sulfate	mg/L	--	--	26	26	--	--	--	--	--	--	--	--	--	17	11	11	11	16	--	--
Nutrients																					
Nitrate + Nitrite as N	mg/L	--	10	0.04	0.08	--	--	--	--	--	--	--	--	--	0.08	0.04	0.03	0.03	0.08	--	--
Phosphorus (TOT)	mg/L	--	--	0.008	0.009	--	--	--	--	--	--	--	--	--	0.011	0.051	0.045	0.017 J	0.015	--	--
Total Persulfate Nitrogen	mg/L	--	--	0.11	0.13	--	--	--	--	--	--	--	--	--	--	0.38	0.45	0.16	0.16	--	--
Metals - Trace Constituents																					
Aluminum (DIS)	mg/L	0.087	--	<0.009	<0.009	--	--	--	--	--	--	--	--	--	<0.009	<0.009	<0.009	<0.009	<0.009	--	--
Antimony (TRC)	mg/L	--	0.0056	<0.0005	<0.0005	--	--	--	--	--	--	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	--
Arsenic (TRC)	mg/L	0.15	0.01	<0.001	<0.001	--	--	--	--	--	--	--	--	--	<0.001	0.002	0.002	<0.001	<0.001	--	--
Barium (TRC)	mg/L	--	1	0.156	0.148	--	--	--	--	--	--	--	--	--	0.131	0.151	0.149	0.127	0.134	--	--
Beryllium (TRC)	mg/L	--	0.004	<0.0008	<0.0008	--	--	--	--	--	--	--	--	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	--
Cadmium (TRC)	mg/L	0.00026	0.005	<0.00003	<0.00003	--	--	--	--	--	--	--	--	--	<0.00003	0.0001	0.00008	<0.00003	<0.00003	--	--
Chromium (TRC)	mg/L	--	0.1	<0.01	<0.01	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	--	--
Cobalt (TRC)	mg/L	--	--	<0.01	<0.01	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	--	--
Copper (TRC)	mg/L	0.0029	1.3	<0.002	<0.002	--	--	--	--	--	--	--	--	--	<0.002	0.003	0.003	<0.002	<0.002	--	--
Iron (TRC)	mg/L	1	--	0.05	0.06	--	--	--	--	--	--	--	--	--	0.16	3.04	3.01	0.28	0.24	--	--
Lead (TRC)	mg/L	0.00054	0.015	<0.0003	<0.0003	--	--	--	--	--	--	--	--	--	<0.0003	0.003	0.003	<0.0003	<0.0003	--	--
Manganese (TRC)	mg/L	--	--	<0.005	<0.005	--	--	--	--	--	--	--	--	--	0.009	0.098	0.097	0.015	0.019	--	--
Mercury (TRC)	mg/L	0.00091	0.00005	<0.000005	<0.000005	--	--	--	--	--	--	--	--	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	--
Mercury (TRC)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum (TRC)	mg/L	--	--	<0.002	<0.002	--	--	--	--	--	--	--	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	--	--
Nickel (TRC)	mg/L	0.016	0.1	<0.001	<0.001	--	--	--	--	--	--	--	--	--	<0.002	0.002	0.002	<0.001	<0.001	--	--
Selenium (TRC)	mg/L	0.005	0.05	<0.0002	<0.0002	--	--	--	--	--	--	--	--	--	<0.0002	0.0003	0.0002	<0.0002	<0.0002	--	--
Silver (TRC)	mg/L	--	0.1	<0.0002	<0.0002	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--
Strontium (TRC)	mg/L	--	4	0.123 D	0.12 D	--	--	--	--	--	--	--	--	--	0.16	0.15 D	0.149 D	0.171 D	0.174 D	--	--
Thallium (TRC)	mg/L	--	0.00024	<0.0002	<0.0002	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--
Uranium (TRC)	mg/L	--	0.03	<0.008	<0.008	--	--	--	--	--	--	--	--	--	<0.008	<0.008	<0.008	<0.008	0.0007	--	--
Zinc (TRC)	mg/L	0.037	2	0.003	<0.002	--	--	--	--	--	--	--	--	--	<0.002	0.013	0.013	0.003	<0.002	--	--

z - no laboratory ID
 NM = Not measured
 NF-ICE = Not flowing; ice on ground
 NM-ICE = Not measured; ice prohibitive
 NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

Aquatic Life Standard Chronic*

Human Health Standard Surface water

 *Calculated @ 25mg/L Hardness

Station Name	Reporting Units	Aquatic Life Standard Chronic*	Human Health Standard Surface water	SW-8	SW-8	SW-9	SW-9	SW-9	SW-9	SW-10	SW-10	SW-10	SW-10	SW-11	SW-11	SW-11	SW-11	SW-14	SW-14	SW-14	SW-14
Sample Date				9/18/18 10:00	11/12/18 16:00	3/20/18 11:45	6/12/18 09:50	9/18/18 11:25	11/12/18 15:30	3/20/18 11:25	6/12/18 09:30	9/18/18 11:45	11/15/18 14:00	3/20/18 12:15	6/12/18 10:25	9/18/18 10:50	11/12/18 15:15	1/17/18 11:45	2/16/18 10:35	2/16/18 10:50	3/19/18 12:30
Sample ID				BBC-1809-107	BBC-1811-113	BBC-1803-116	BBC-1806-110	BBC-1809-109	BBC-1811-111	BBC-1803-115	BBC-1806-107	BBC-1809-110	BBC-1811-116	BBC-1803-117	BBC-1806-111	BBC-1809-108	BBC-1811-110	BBC-1801-103	BBC-1802-104	BBC-1802-105	BBC-1803-103
Lab Name				HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks				No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample							Duplicate	
Lab Sample ID				z	z	z	z	z	z	z	z	z	z	H18030350-006	H18060369-006	H18090466-006	H18110265-008	H18010282-004	H18020280-004	H18020280-005	H18030350-004
Field Parameters																					
Dissolved Oxygen	mg/L	--	--	9.53	9.9	11.79	10.32	9.49	10.76	1.36	10.34	9.48	11.39	12.58	10.32	9.36	11.26	11.11	10.85	--	12.46
Field pH	s.u.	--	--	8.16	7.84	7.42	7.04	8.28	8.41	6.8	6.66	8.51	8.51	7.79	7.45	8.47	8.38	8.15	8.12	--	8.3
Field Specific Conductivity	umhos/cm	--	--	457	443	439	436	441	437	365	432	431	421	409	400	418	432	403	419	--	370
Flow	Cubic Ft Sec	--	--	0.25	NM-ICE	NM-ICE	3.39	0.52	NM-ICE	NM-ICE	1.57	0.25	NM-ICE	NM-ICE	3.71	0.53	NM-ICE	NF-ICE	NF-ICE	--	NM-ICE
Staff Gauge	Feet	--	--	0.1	--	--	--	--	--	--	1.29	0.99	--	--	0.71	0.35	--	--	--	--	--
Water Temperature	Deg C	--	--	7.11	0.03	1	5.2	8.4	0.62	-0.3	6	11.5	1.3	-0.4	6.4	10.1	0.35	0.42	0.51	--	5.7
Physical Parameters																					
Total Dissolved Solids	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	238	238 D	255 D	245 D	226 D	233 D	233 D	222
Total Suspended Solids	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	68	5	<4	<4	6	<4	<4	<4
Major Constituents - Commons Ions																					
Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	200	200	210	210	210	210	210	210
Calcium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	50	53	54	52	56	58	58	54
Chloride	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	1	<1	1	1	2	2	2	2
Fluoride	mg/L	--	4	--	--	--	--	--	--	--	--	--	--	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Hardness as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	220	226	233	229	214	224	223	208
Magnesium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	23	22	24	24	18	19	19	18
Potassium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	1	<1	1	1	1	1	1	1
Sodium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	3	2	3	3	2	3	3	3
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	33	16	22	28	8	8	8	7
Nutrients																					
Nitrate + Nitrite as N	mg/L	--	10	--	--	--	--	--	--	--	--	--	--	0.24	0.1	0.08	0.19	0.19	0.13	0.13	0.08
Phosphorus (TOT)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.038	0.015	0.02 J	0.009	0.009	0.003	0.004	<0.003
Total Persulfate Nitrogen	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	0.19	0.19	0.27	--	--	--	--
Metals - Trace Constituents																					
Aluminum (DIS)	mg/L	0.087	--	--	--	--	--	--	--	--	--	--	--	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Antimony (TRC)	mg/L	--	0.0056	--	--	--	--	--	--	--	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (TRC)	mg/L	0.15	0.01	--	--	--	--	--	--	--	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium (TRC)	mg/L	--	1	--	--	--	--	--	--	--	--	--	--	0.108	0.094	0.104	0.097	0.122	0.116	0.116	0.111
Beryllium (TRC)	mg/L	--	0.004	--	--	--	--	--	--	--	--	--	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Cadmium (TRC)	mg/L	0.00026	0.005	--	--	--	--	--	--	--	--	--	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Chromium (TRC)	mg/L	--	0.1	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt (TRC)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper (TRC)	mg/L	0.0029	1.3	--	--	--	--	--	--	--	--	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron (TRC)	mg/L	1	--	--	--	--	--	--	--	--	--	--	--	0.6	0.25	0.12	0.07	0.11	<0.02	0.02	0.02
Lead (TRC)	mg/L	0.00054	0.015	--	--	--	--	--	--	--	--	--	--	0.0008	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Manganese (TRC)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.019	0.006	<0.005	0.006	<0.005	<0.005	<0.005
Mercury (TRC)	mg/L	0.00091	0.00005	--	--	--	--	--	--	--	--	--	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Mercury (TRC)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum (TRC)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (TRC)	mg/L	0.016	0.1	--	--	--	--	--	--	--	--	--	--	<0.002	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002
Selenium (TRC)	mg/L	0.005	0.05	--	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silver (TRC)	mg/L	--	0.1	--	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Strontium (TRC)	mg/L	--	4	--	--	--	--	--	--	--	--	--	--	0.15	0.176 D	0.176 D	0.176 D	0.121	0.122	0.122	0.115
Thallium (TRC)	mg/L	--	0.00024	--	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Uranium (TRC)	mg/L	--	0.03	--	--	--	--	--	--	--	--	--	--	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Zinc (TRC)	mg/L	0.037	2	--	--	--	--	--	--	--	--	--	--	0.007	0.003	0.003	<0.002	0.006	<0.002	<0.002	<0.002

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Aquatic Life Standard Chronic*
	Human Health Standard Surface water

*Calculated @ 25mg/L Hardness

Station Name	Reporting Units	Aquatic Life Standard Chronic*	Human Health Standard Surface water	SW-14	SW-14	SW-14	SW-14	SW-14	SW-14	SW-14	SW-14	SW-14	SW-14	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17
Sample Date				4/12/18 12:15	5/24/18 13:15	6/12/18 12:35	7/24/18 12:55	8/28/18 12:40	9/17/18 17:00	10/23/18 14:40	11/12/18 13:30	11/12/18 13:45	12/14/18 09:30	1/17/18 12:05	2/16/18 11:15	3/20/18 14:50	4/12/18 13:45	5/24/18 11:50	6/11/18 16:25	7/24/18 14:10	8/28/18 13:05
Sample ID				BBC-1804-102	BBC-1805-120	BBC-1806-114	BBC-1807-104	BBC-1808-103	BBC-1809-103	BBC-1810-107	BBC-1811-104	BBC-1811-105	BBC-1812-103	BBC-1801-104	BBC-1802-106	BBC-1803-122	BBC-1804-106	BBC-1805-117	BBC-1806-106	BBC-1807-107	BBC-1808-104
Lab Name				Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks												Duplicate									
Lab Sample ID				H18040276-003	H18050618-007	H18060369-009	H18070561-005	H18080619-004	H18090466-004	H18100607-008	H18110265-004	H18110265-005	H18120294-003	H18010282-005	H18020280-006	H18030350-009	H18040276-006	H18050618-004	H18060369-005	H18070561-007	H18080619-005
Field Parameters																					
Dissolved Oxygen	mg/L	--	--	12.79	9.21	9.49	9.29	10.44	10.85	12.19	12.9	--	8.94	10.8	11.07	11.12	--	9.32	9.97	9.34	10.13
Field pH	s.u.	--	--	8.15	8.04	7.83	8.08	8.3	8.48	8.22	8.34	--	7.6	7.92	8.16	8.06	--	7.86	8.1	8.32	8.34
Field Specific Conductivity	umhos/cm	--	--	419	371	425	390	400	402	406	416	--	431	487	437	454	--	319	436	405	418
Flow	Cubic Ft Sec	--	--	0.29	9.19	6.59	2.25	1.09	0.79	0.66	0.88	--	NM-ICE	NF-ICE	NF-ICE	NM-ICE	NM-ICE	1.8	0.3	0.25	0.11
Staff Gauge	Feet	--	--	0.3	--	0.72	0.54	--	0.5	0.44	0.45	--	--	--	--	--	--	--	--	--	--
Water Temperature	Deg C	--	--	4.6	11.7	10.7	13.2	11	14.7	7.7	3.7	--	1.3	0.04	0.02	2.9	--	9.4	10.3	13.3	8.9
Physical Parameters																					
Total Dissolved Solids	mg/L	--	--	232 D	222 D	244 D	219 D	234 D	241 D	227 D	230 D	239 D	226 D	271 D	272 D	260	299 D	197 D	273 D	231 D	238 D
Total Suspended Solids	mg/L	--	--	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	4	6 J	<4	<4	<4	13	4	14 J
Major Constituents - Commons Ions																					
Alkalinity as CaCO3	mg/L	--	--	220	180	210	210	210	210	220	220	220	220	210	210	210	210	150	210	200	200
Calcium (DIS)	mg/L	--	--	59	48	59	52	54	53	55	53	52	56	58	59	57	63	44	59	49	51
Chloride	mg/L	--	--	2	2	4	1	2	2	2	2	2	3	4	4	4	7	4	3	3	3
Fluoride	mg/L	--	4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2
Hardness as CaCO3	mg/L	--	--	225	196	225	207	212	213	223	220	217	218	246	249	241	262	167	244	219	221
Magnesium (DIS)	mg/L	--	--	19	18	19	19	19	20	21	21	21	19	25	25	24	25	14	23	24	23
Potassium (DIS)	mg/L	--	--	1	1	1	1	1	2	1	1	1	1	1	1	1	1	<1	<1	1	1
Sodium (DIS)	mg/L	--	--	3	2	3	2	3	3	2	3	3	3	2	2	3	3	2	2	2	2
Sulfate	mg/L	--	--	9	11	9	8	9	10	12	16	16	9	36	34	34	44	12	20	23	26
Nutrients																					
Nitrate + Nitrite as N	mg/L	--	10	0.13	0.08	0.26	0.03	0.02	0.01	0.03	0.06	0.06	0.19	0.13	0.15	0.1	0.15	<0.01	0.05	0.07	0.04
Phosphorus (TOT)	mg/L	--	--	0.004	0.009	0.008	0.006	0.009 J	0.009 J	<0.003	0.004	0.003	0.006	0.008	0.014	0.007	0.015	0.011	0.016	0.011	0.018 J
Total Persulfate Nitrogen	mg/L	--	--	0.22	0.33	0.36	0.13	0.13 J	0.16	0.12	0.14	0.14	0.27	--	--	--	0.34	0.24	0.34	0.17	0.22 J
Metals - Trace Constituents																					
Aluminum (DIS)	mg/L	0.087	--	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	0.016	<0.009	<0.009	<0.009
Antimony (TRC)	mg/L	--	0.0056	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (TRC)	mg/L	0.15	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium (TRC)	mg/L	--	1	0.118	0.101	0.118	0.118	0.11	0.113	0.119	0.117	0.114	0.13	0.148	0.16	0.151	0.146	0.108	0.149	0.152	0.141
Beryllium (TRC)	mg/L	--	0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Cadmium (TRC)	mg/L	0.00026	0.005	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	0.00017	<0.00003	<0.00003
Chromium (TRC)	mg/L	--	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt (TRC)	mg/L	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper (TRC)	mg/L	0.0029	1.3	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron (TRC)	mg/L	1	--	0.05	0.08	0.08	0.06	0.06 J	0.06	0.04	0.03	0.04	0.03	0.11	0.26	0.17	0.27	0.16	0.36	0.16	0.08 J
Lead (TRC)	mg/L	0.00054	0.015	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Manganese (TRC)	mg/L	--	--	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.028	0.04	0.027	0.051	0.014	0.028	0.014	0.008
Mercury (TRC)	mg/L	0.00091	0.00005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Mercury (TRC)	ug/L	--	--	--	--	--	--	--	--	--	--	--	<0.005	--	--	--	--	--	--	--	--
Molybdenum (TRC)	mg/L	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (TRC)	mg/L	0.016	0.1	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (TRC)	mg/L	0.005	0.05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silver (TRC)	mg/L	--	0.1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Strontium (TRC)	mg/L	--	4	0.124	0.109 D	0.134 D	0.129 D	0.126 D	0.122 D	0.132 D	0.128 D	0.127 D	0.132 D	0.154	0.158	0.152	0.164	0.115 D	0.162 D	0.13 D	0.135 D
Thallium (TRC)	mg/L	--	0.00024	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	0.0002
Uranium (TRC)	mg/L	--	0.03	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0006	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Zinc (TRC)	mg/L	0.037	2	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	0.002	0.004	0.008	<0.002	<0.002	<0.002	0.003	0.006

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Aquatic Life Standard Chronic*
	Human Health Standard Surface water

*Calculated @ 25mg/L Hardness

Station Name	Reporting Units	Aquatic Life Standard Chronic*	Human Health Standard Surface water	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-18	SW-18	SW-18	SW-18	SW-18	SW-18	SW-18	SW-18	SW-18	SW-18	SW-18	
Sample Date				8/28/18 13:05	9/18/18 13:10	9/18/18 13:30	10/23/18 13:40	10/23/18 14:00	11/12/18 14:00	12/14/18 09:10	1/17/18 15:35	2/16/18 14:20	3/19/18 12:45	4/18/18 12:30	5/24/18 13:45	6/11/18 16:00	7/24/18 13:50	8/28/18 16:20	10/23/18 16:40	11/12/18 14:50	12/14/18 15:30	
Sample ID				BBC-1808-105	BBC-1809-113	BBC-1809-114	BBC-1810-103	BBC-1810-104	BBC-1811-106	BBC-1812-101	BBC-1801-119	BBC-1802-111	BBC-1803-105	BBC-1804-121	BBC-1805-121	BBC-1806-104	BBC-1807-106	BBC-1808-107	BBC-1810-111	BBC-1811-109	BBC-1812-122	
Lab Name				Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO
Remarks				Duplicate		Duplicate		Duplicate			No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample
Lab Sample ID				H18080619-006	H18090466-008	H18090466-009	H18100607-004	H18100607-005	H18110265-006	H18120294-002	z	z	z	z	z	z	z	z	z	z		
Field Parameters																						
Dissolved Oxygen	mg/L	--	--	--	10.32	--	10.99	10.99	10.78	10.56	--	--	--	--	--	--	--	--	--	--	--	
Field pH	s.u.	--	--	--	8.41	--	7.87	7.87	8.21	7.47	--	--	--	--	--	--	--	--	--	--	--	
Field Specific Conductivity	umhos/cm	--	--	--	433	--	441	441	442	471	--	--	--	--	--	--	--	--	--	--	--	
Flow	Cubic Ft Sec	--	--	--	0.19	--	0.19	0.19	NM-ICE	NM-ICE	NF-DRY	NF-DRY	NF-DRY	NF-DRY	NM	NF-DRY	NF-DRY	NF-DRY	NF-DRY	NM-DRY	NF-DRY	
Staff Gauge	Feet	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Water Temperature	Deg C	--	--	--	10.7	--	5.3	5.3	0.51	0.39	--	--	--	--	--	--	--	--	--	--	--	
Physical Parameters																						
Total Dissolved Solids	mg/L	--	--	235 D	268 D	258 D	254 D	254 D	253 D	253 D	--	--	--	--	--	--	--	--	--	--	--	
Total Suspended Solids	mg/L	--	--	<4	<4	4	<4	<4	<4	<4	--	--	--	--	--	--	--	--	--	--	--	
Major Constituents - Commons Ions																						
Alkalinity as CaCO3	mg/L	--	--	200	210	210	210	210	210	210	--	--	--	--	--	--	--	--	--	--	--	
Calcium (DIS)	mg/L	--	--	50	54	54	57	58	53	56	--	--	--	--	--	--	--	--	--	--	--	
Chloride	mg/L	--	--	3	3	3	4	4	5	5	--	--	--	--	--	--	--	--	--	--	--	
Fluoride	mg/L	--	4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	--	--	--	--	--	--	--	--	--	--	--	
Hardness as CaCO3	mg/L	--	--	217	237	237	246	251	236	240	--	--	--	--	--	--	--	--	--	--	--	
Magnesium (DIS)	mg/L	--	--	22	25	25	25	26	25	25	--	--	--	--	--	--	--	--	--	--	--	
Potassium (DIS)	mg/L	--	--	1	1	1	1	1	1	1	--	--	--	--	--	--	--	--	--	--	--	
Sodium (DIS)	mg/L	--	--	2	3	3	2	2	2	2	--	--	--	--	--	--	--	--	--	--	--	
Sulfate	mg/L	--	--	26	26	26	33	33	34	34	--	--	--	--	--	--	--	--	--	--	--	
Nutrients																						
Nitrate + Nitrite as N	mg/L	--	10	0.04	0.03	0.02	0.06	0.06	0.11	0.19	--	--	--	--	--	--	--	--	--	--	--	
Phosphorus (TOT)	mg/L	--	--	0.007 J	0.088 J	0.006 J	0.004	0.005	0.015	0.007	--	--	--	--	--	--	--	--	--	--	--	
Total Persulfate Nitrogen	mg/L	--	--	0.13 J	0.12	0.15	0.14	0.14	0.18	0.27	--	--	--	--	--	--	--	--	--	--	--	
Metals - Trace Constituents																						
Aluminum (DIS)	mg/L	0.087	--	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	--	--	--	--	--	--	--	--	--	--	--	
Antimony (TRC)	mg/L	--	0.0056	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	--	--	--	--	--	--	--	--	--	--	
Arsenic (TRC)	mg/L	0.15	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--	--	--	--	
Barium (TRC)	mg/L	--	1	0.147	0.153	0.152	0.16	0.154	0.157	0.168	--	--	--	--	--	--	--	--	--	--	--	
Beryllium (TRC)	mg/L	--	0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	--	--	--	--	--	--	--	--	--	--	
Cadmium (TRC)	mg/L	0.00026	0.005	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--	--	--	--	--	--	--	--	--	--	--	
Chromium (TRC)	mg/L	--	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	
Cobalt (TRC)	mg/L	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	
Copper (TRC)	mg/L	0.0029	1.3	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--	--	--	--	--	--	--	
Iron (TRC)	mg/L	1	--	0.12 J	0.09	0.09	0.1	0.1	0.13	0.09	--	--	--	--	--	--	--	--	--	--	--	
Lead (TRC)	mg/L	0.00054	0.015	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	--	--	--	--	--	--	--	--	--	
Manganese (TRC)	mg/L	--	--	0.009	0.01	0.009	0.013	0.013	0.024	0.03	--	--	--	--	--	--	--	--	--	--	--	
Mercury (TRC)	mg/L	0.00091	0.00005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	--	--	--	--	--	--	--	--	--	--	--	
Mercury (TRC)	ug/L	--	--	--	--	--	--	--	--	<0.005	--	--	--	--	--	--	--	--	--	--	--	
Molybdenum (TRC)	mg/L	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--	--	--	--	--	--	--	
Nickel (TRC)	mg/L	0.016	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--	--	--	--	
Selenium (TRC)	mg/L	0.005	0.05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--	--	--	--	--	--	
Silver (TRC)	mg/L	--	0.1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--	--	--	--	--	--	
Strontium (TRC)	mg/L	--	4	0.135 D	0.141 D	0.14 D	0.147 D	0.143 D	0.146 D	0.161 D	--	--	--	--	--	--	--	--	--	--	--	
Thallium (TRC)	mg/L	--	0.00024	0.0002	0.0002	0.0002	<0.0002	<0.0002	<0.0002	0.0002	--	--	--	--	--	--	--	--	--	--	--	
Uranium (TRC)	mg/L	--	0.03	<0.008	<0.008	<0.008	0.03	<0.008	<0.008	0.0007	--	--	--	--	--	--	--	--	--	--	--	
Zinc (TRC)	mg/L	0.037	2	0.005 J	0.003	0.002	0.002	0.002	0.002	<0.002	--	--	--	--	--	--	--	--	--	--	--	

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Aquatic Life Standard Chronic*
	Human Health Standard Surface water

*Calculated @ 25mg/L Hardness

Station Name	Reporting Units	Aquatic Life Standard Chronic*	Human Health Standard Surface water	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1	USGS-SC1
Sample Date				1/17/18 11:15	1/17/18 11:30	2/16/18 10:15	3/19/18 12:00	3/19/18 12:15	4/12/18 11:30	5/24/18 16:10	6/11/18 15:00	7/24/18 12:10	8/28/18 11:55	9/17/18 16:30	10/23/18 12:40	11/12/18 13:00	12/14/18 10:15
Sample ID				BBC-1801-101	BBC-1801-102	BBC-1802-103	BBC-1803-101	BBC-1803-102	BBC-1804-101	BBC-1805-115	BBC-1806-102	BBC-1807-103	BBC-1808-102	BBC-1809-102	BBC-1810-102	BBC-1811-102	BBC-1812-106
Lab Name				Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks					Duplicate			Duplicate									
Lab Sample ID				H18010282-002	H18010282-003	H18020280-003	H18030350-002	H18030350-003	H18040276-002	H18050618-002	H18060369-003	H18070561-004	H18080619-003	H18090466-003	H18100607-003	H18110265-003	H18120294-006
Field Parameters																	
Dissolved Oxygen	mg/L	--	--	11.56	--	11.57	12.14	--	13.56	10.82	11.12	9.58	10.21	9.4	11.37	11.32	10.58
Field pH	s.u.	--	--	8.18	--	8.17	8.08	--	8.26	7.66	7.77	8.1	8.26	8.51	7.78	8.19	7.91
Field Specific Conductivity	umhos/cm	--	--	137	--	356	364	--	353	239	319	340	348	352	358	366	373
Flow	Cubic Ft Sec	--	--	NF-ICE	--	NF-ICE	NM-ICE	--	NM-ICE	NM	58.47	30.14	18.61	16.02	11.62	NM-ICE	NM-ICE
Staff Gauge	Feet	--	--	--	--	--	--	--	--	--	--	--	0.48	--	0.04	--	--
Water Temperature	Deg C	--	--	0.15	--	0.09	-0.2	--	0.2	4.1	5.8	10.6	6.7	10.7	2.8	0.1	0.07
Physical Parameters																	
Total Dissolved Solids	mg/L	--	--	202 D	201 D	204 D	198	198	191 D	144 D	179 D	194 D	205 D	203 D	196 D	196 D	190 D
Total Suspended Solids	mg/L	--	--	<4	<4	<4	<4	<4	<4	17	6	<4	<4	<4	<4	6 J	<4
Major Constituents - Commons Ions																	
Alkalinity as CaCO3	mg/L	--	--	190	190	180	190	190	180	130	160	180	180	190	190	190	190
Calcium (DIS)	mg/L	--	--	53	54	56	53	52	53	37	50	52	52	54	54	53	56
Chloride	mg/L	--	--	2	2	1	2	2	3	1	1	1	1	1	2	2	2
Fluoride	mg/L	--	4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hardness as CaCO3	mg/L	--	--	188	189	197	185	184	185	128	173	180	183	192	192	190	196
Magnesium (DIS)	mg/L	--	--	13	13	14	13	13	13	9	12	13	13	14	14	14	14
Potassium (DIS)	mg/L	--	--	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sodium (DIS)	mg/L	--	--	2	2	2	2	2	3	2	2	2	2	2	2	2	2
Sulfate	mg/L	--	--	7	7	7	7	7	7	4	5	6	6	6	8	8	7
Nutrients																	
Nitrate + Nitrite as N	mg/L	--	10	0.1	0.1	0.11	0.08	0.08	0.06	0.02	0.02	0.01	0.02	0.01	0.03	0.06	0.11
Phosphorus (TOT)	mg/L	--	--	0.005	0.006	0.007	<0.003	<0.003	<0.003	0.02	0.006	0.005	<0.003	0.006 J	<0.003	0.008	0.005
Total Persulfate Nitrogen	mg/L	--	--	--	--	--	--	--	0.1	0.11	<0.04	0.05	0.06 J	0.06	0.07	0.1	0.14
Metals - Trace Constituents																	
Aluminum (DIS)	mg/L	0.087	--	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	0.019	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Antimony (TRC)	mg/L	--	0.0056	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (TRC)	mg/L	0.15	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium (TRC)	mg/L	--	1	0.065	0.067	0.067	0.064	0.064	0.062	0.064	0.07	0.076	0.067	0.068	0.066	0.073	0.071
Beryllium (TRC)	mg/L	--	0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Cadmium (TRC)	mg/L	0.00026	0.005	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Chromium (TRC)	mg/L	--	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt (TRC)	mg/L	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper (TRC)	mg/L	0.0029	1.3	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron (TRC)	mg/L	1	--	0.12	0.13	0.12	0.12	0.11	0.19	0.52	0.22	0.07	0.08 J	0.08	0.08	0.23	0.1
Lead (TRC)	mg/L	0.00054	0.015	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Manganese (TRC)	mg/L	--	--	0.009	0.009	0.008	0.007	0.007	0.011	0.011	0.009	0.006	0.006	0.006	0.005	0.01	0.007
Mercury (TRC)	mg/L	0.00091	0.00005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--
Mercury (TRC)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.005
Molybdenum (TRC)	mg/L	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (TRC)	mg/L	0.016	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (TRC)	mg/L	0.005	0.05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silver (TRC)	mg/L	--	0.1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Strontium (TRC)	mg/L	--	4	0.142	0.144	0.148	0.14	0.138	0.135	0.123 D	0.144 D	0.138 D	0.141 D	0.144 D	0.147 D	0.154 D	0.152 D
Thallium (TRC)	mg/L	--	0.00024	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.002
Uranium (TRC)	mg/L	--	0.03	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0004
Zinc (TRC)	mg/L	0.037	2	<0.002	<0.002	0.004	<0.002	<0.002	<0.002	0.009	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	0.002

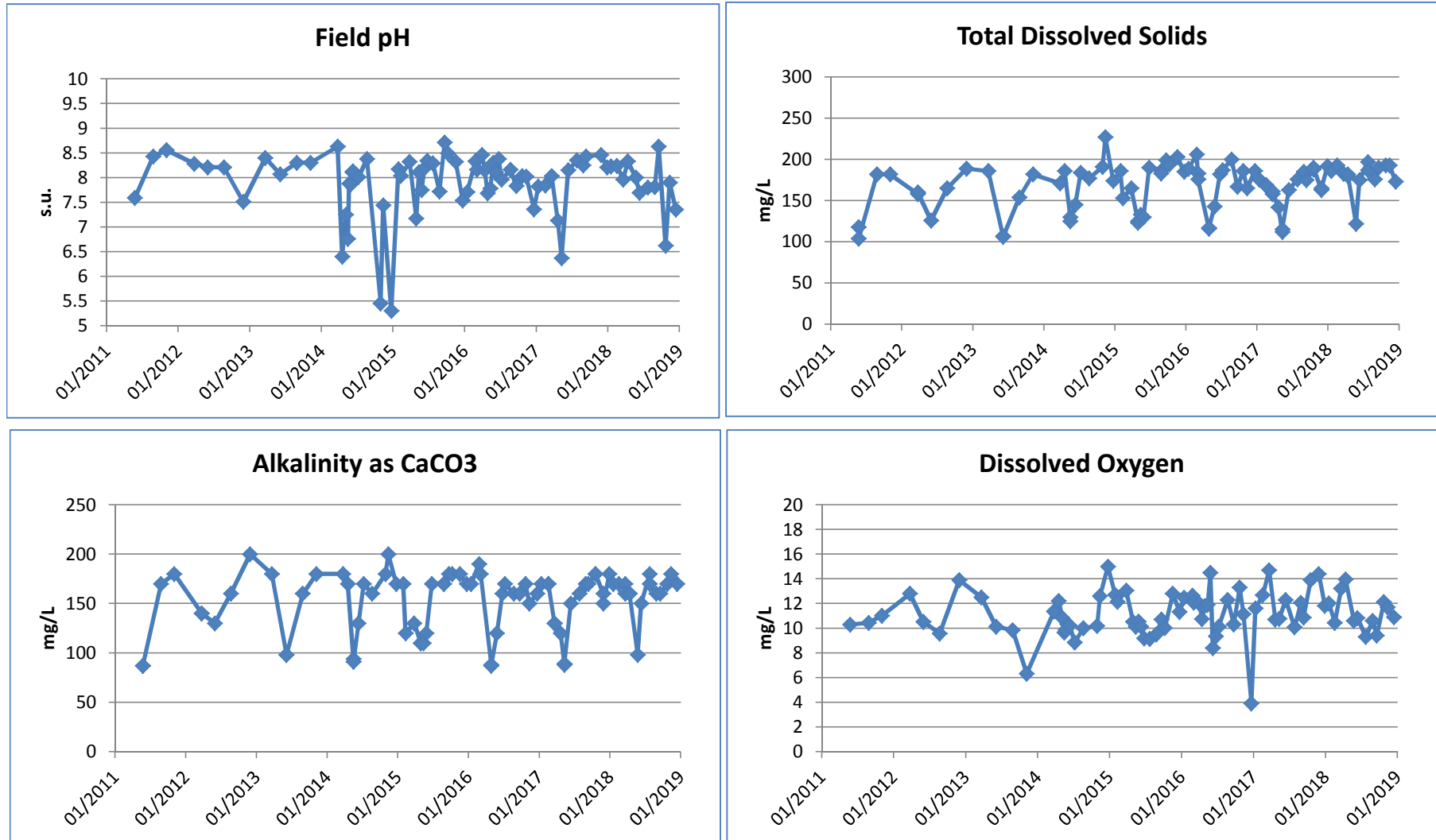
z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Aquatic Life Standard Chronic*
	Human Health Standard Surface water

*Calculated @ 25mg/L Hardness

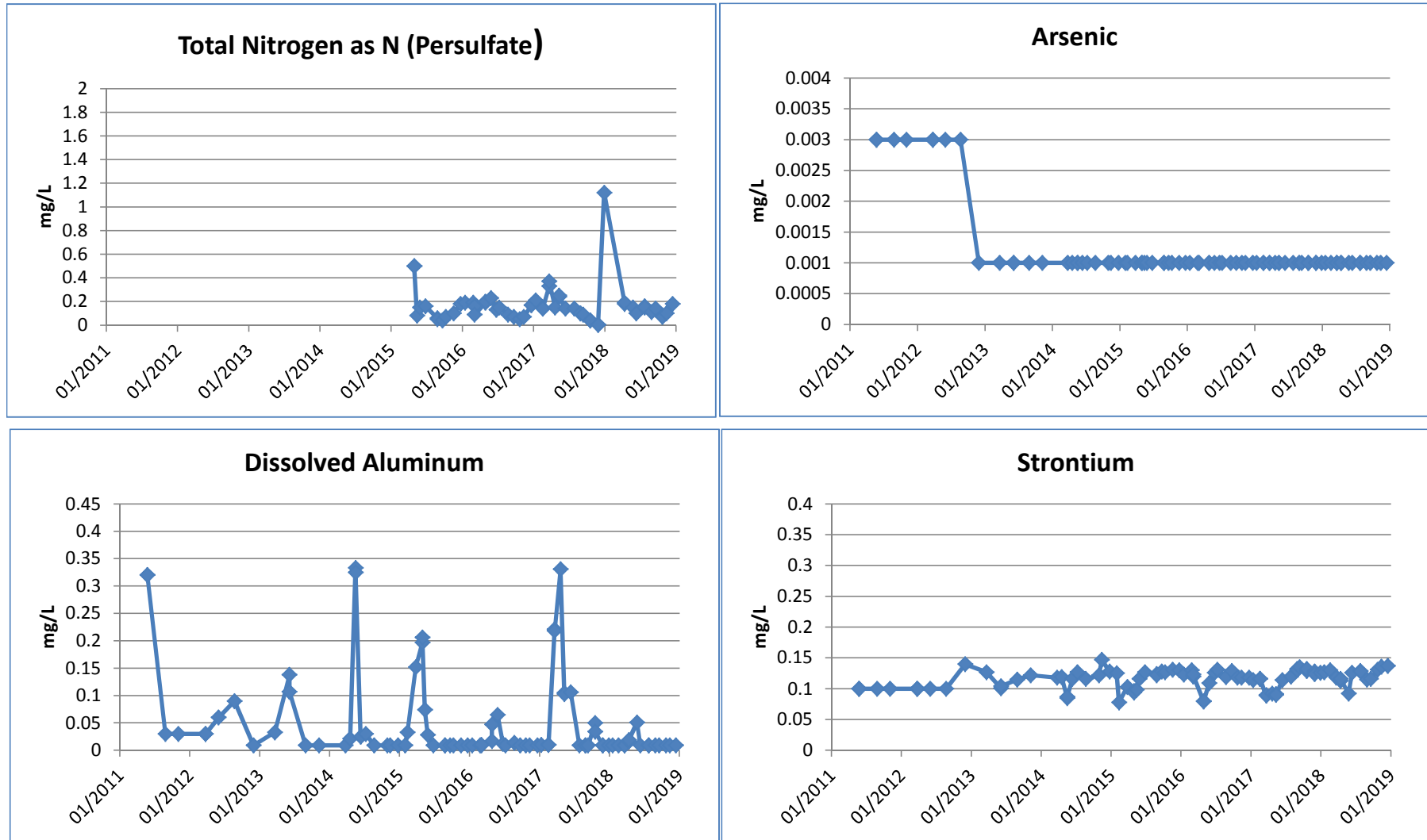
SW-1



Hydrometrics, Inc.
Consulting Scientists and Engineers

**SW-1 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

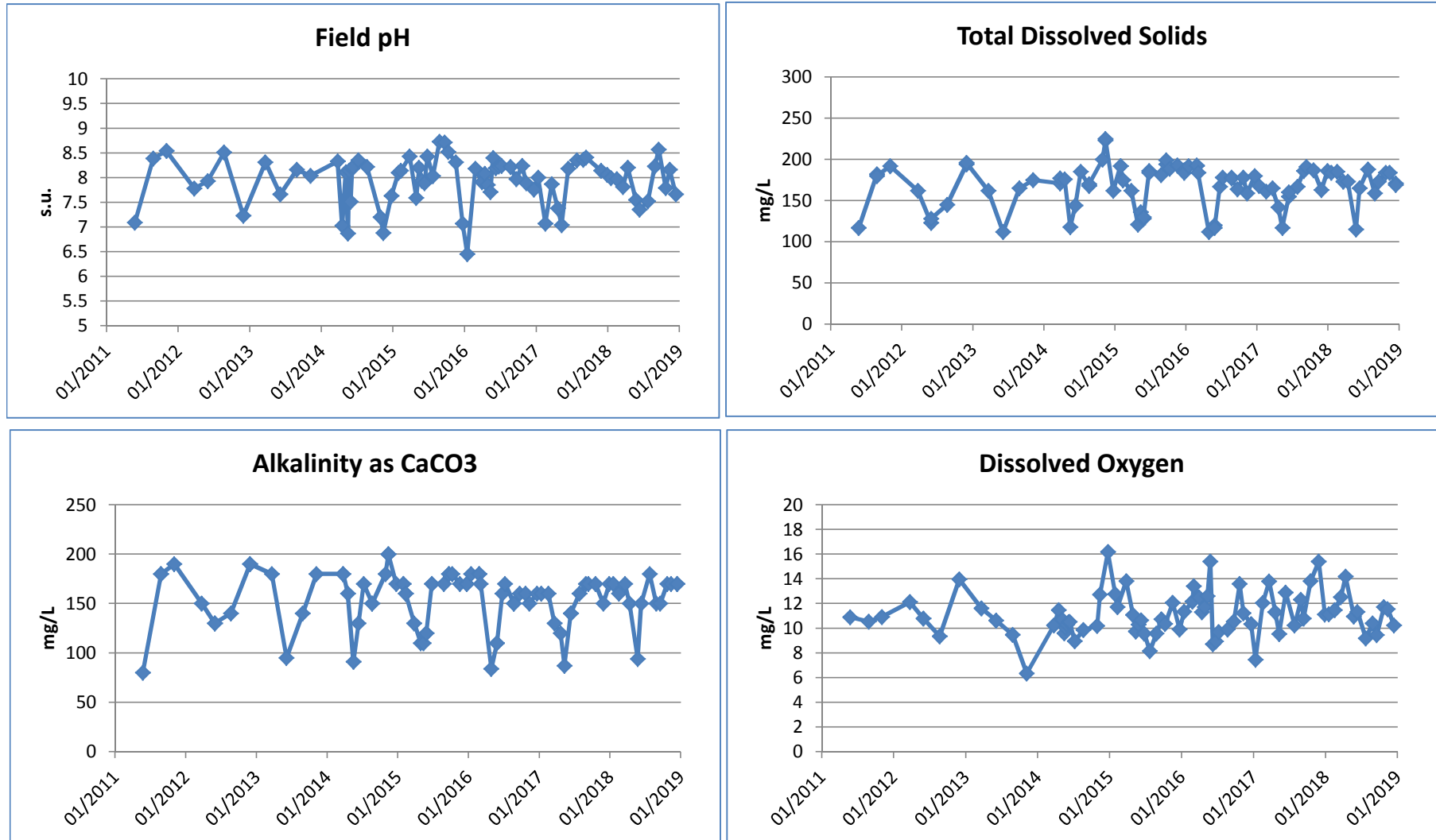
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Hydrometrics, Inc.
Consulting Scientists and Engineers

**SW-1 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

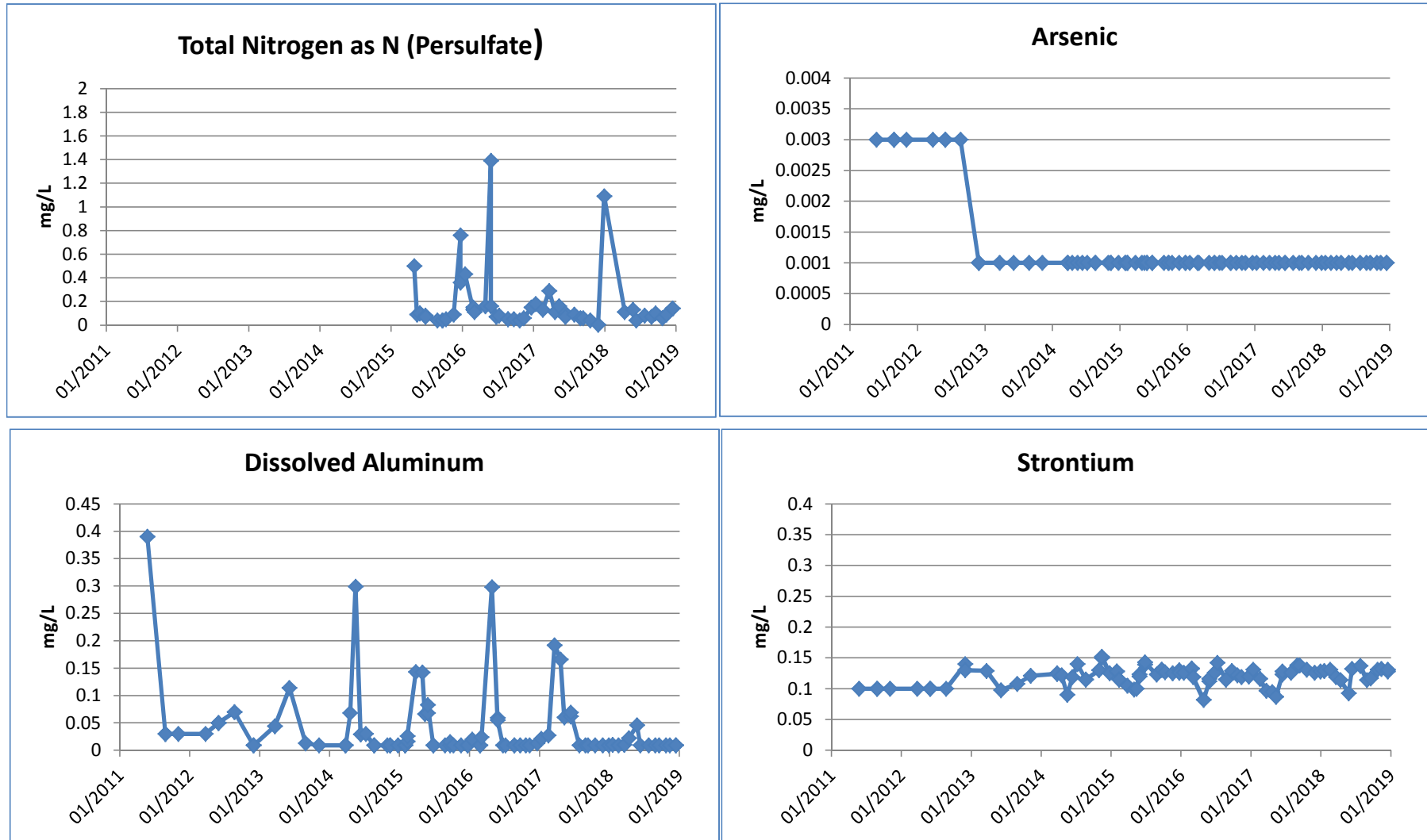
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Hydrometrics, Inc.
Consulting Scientists and Engineers

**SW-2 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

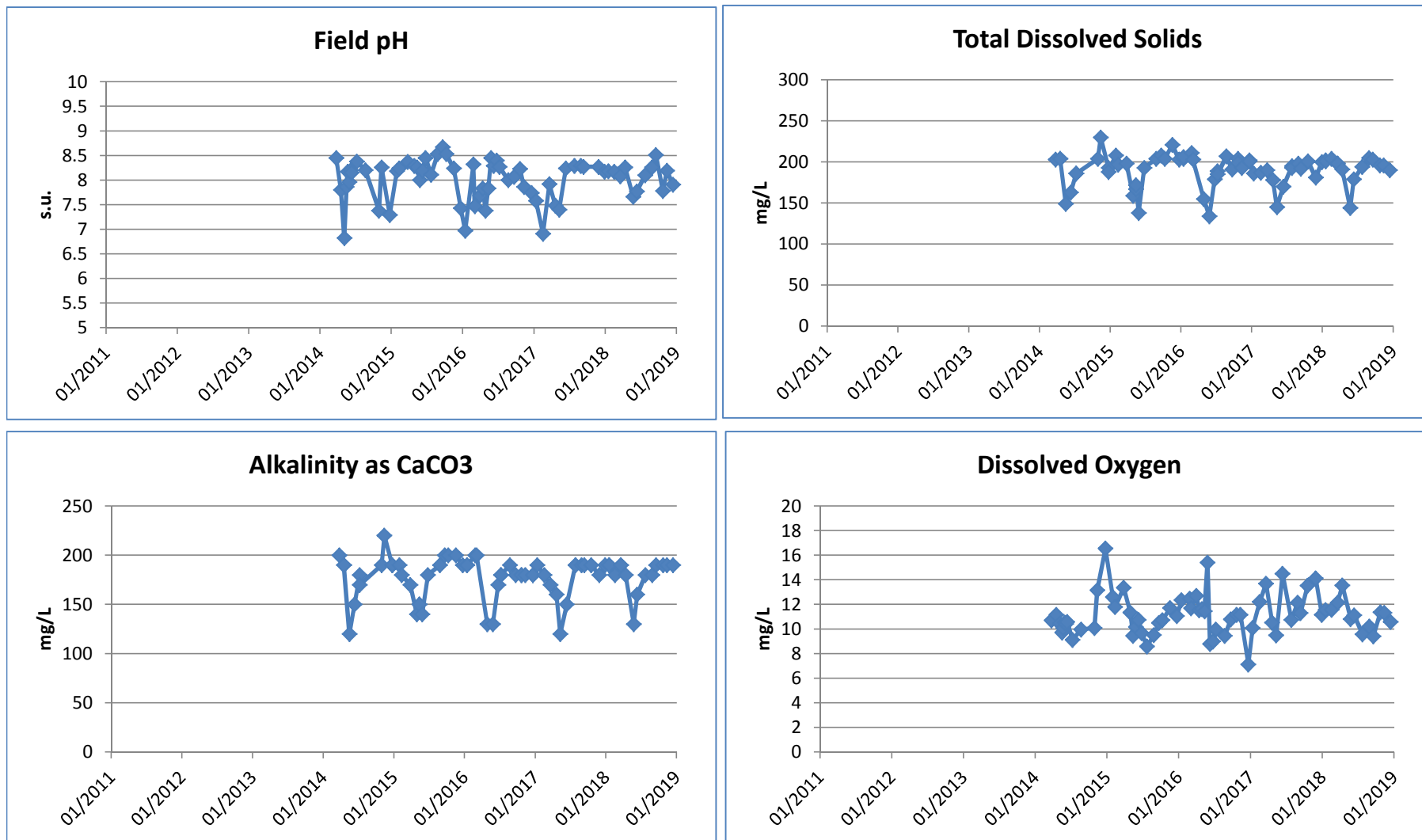
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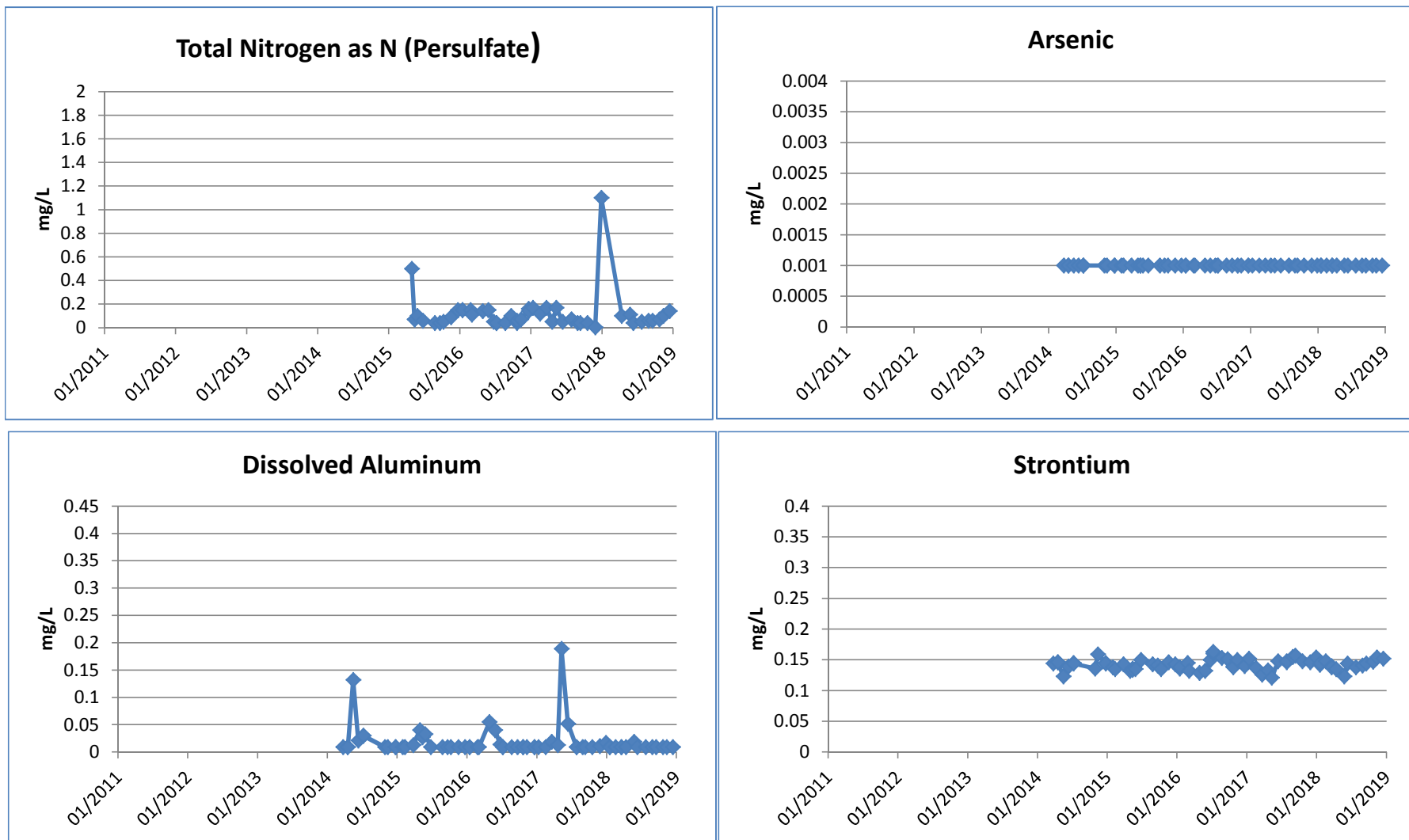
Hydrometrics, Inc.
Consulting Scientists and Engineers

**SW-2 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

USGS-SC1



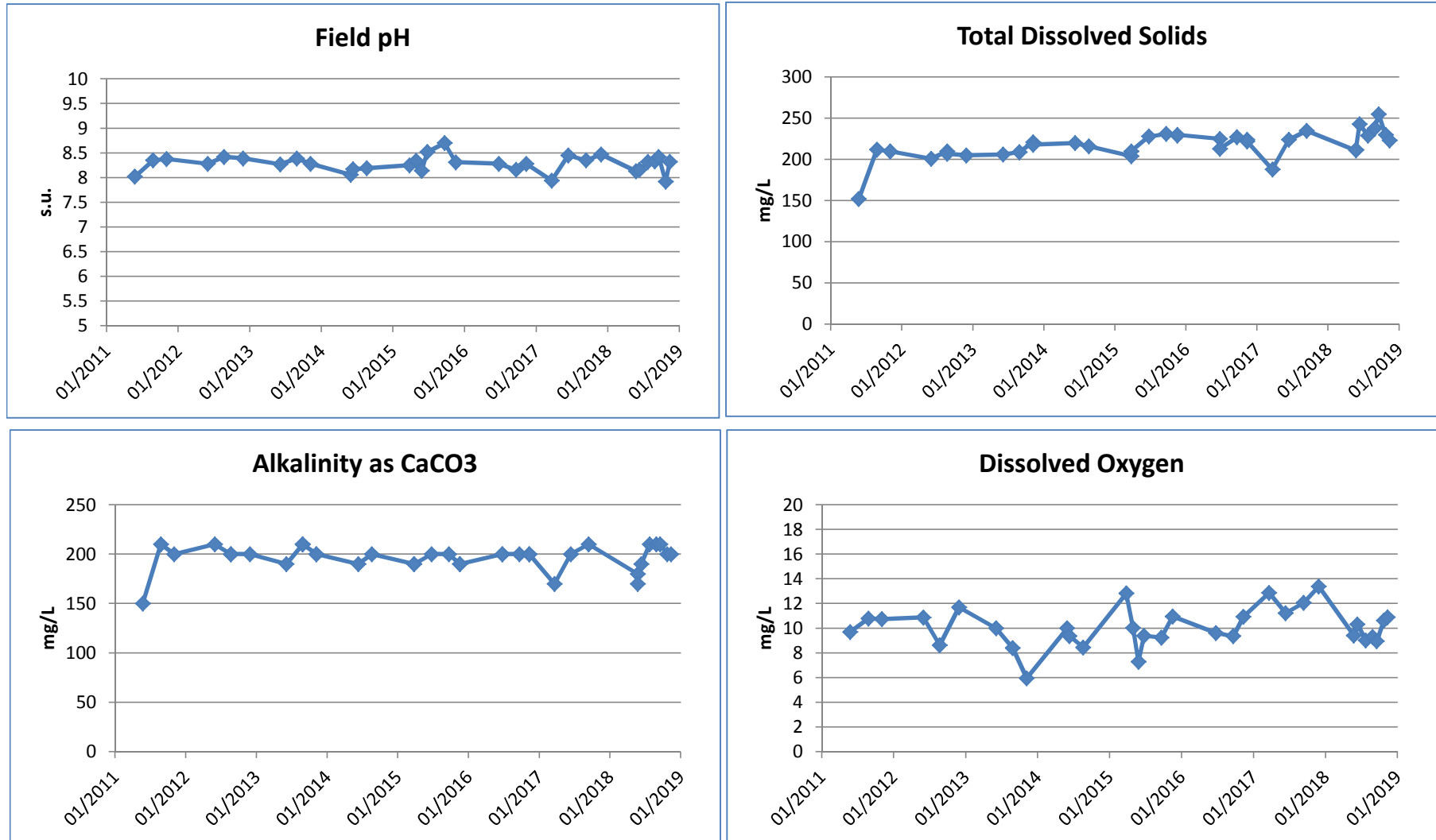
USGS-SC1



Hydrometrics, Inc.
Consulting Scientists and Engineers

**USGS-SC1 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

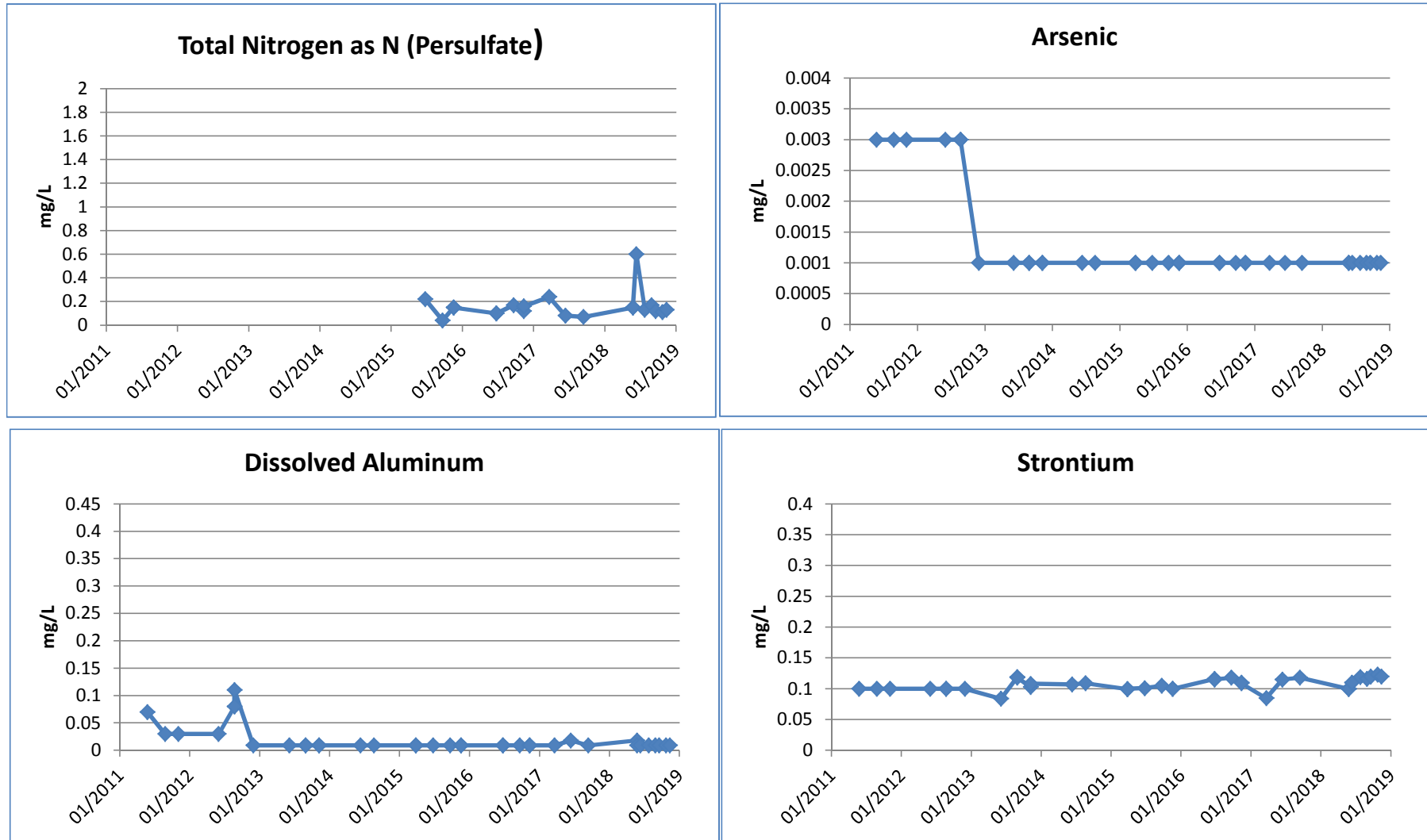
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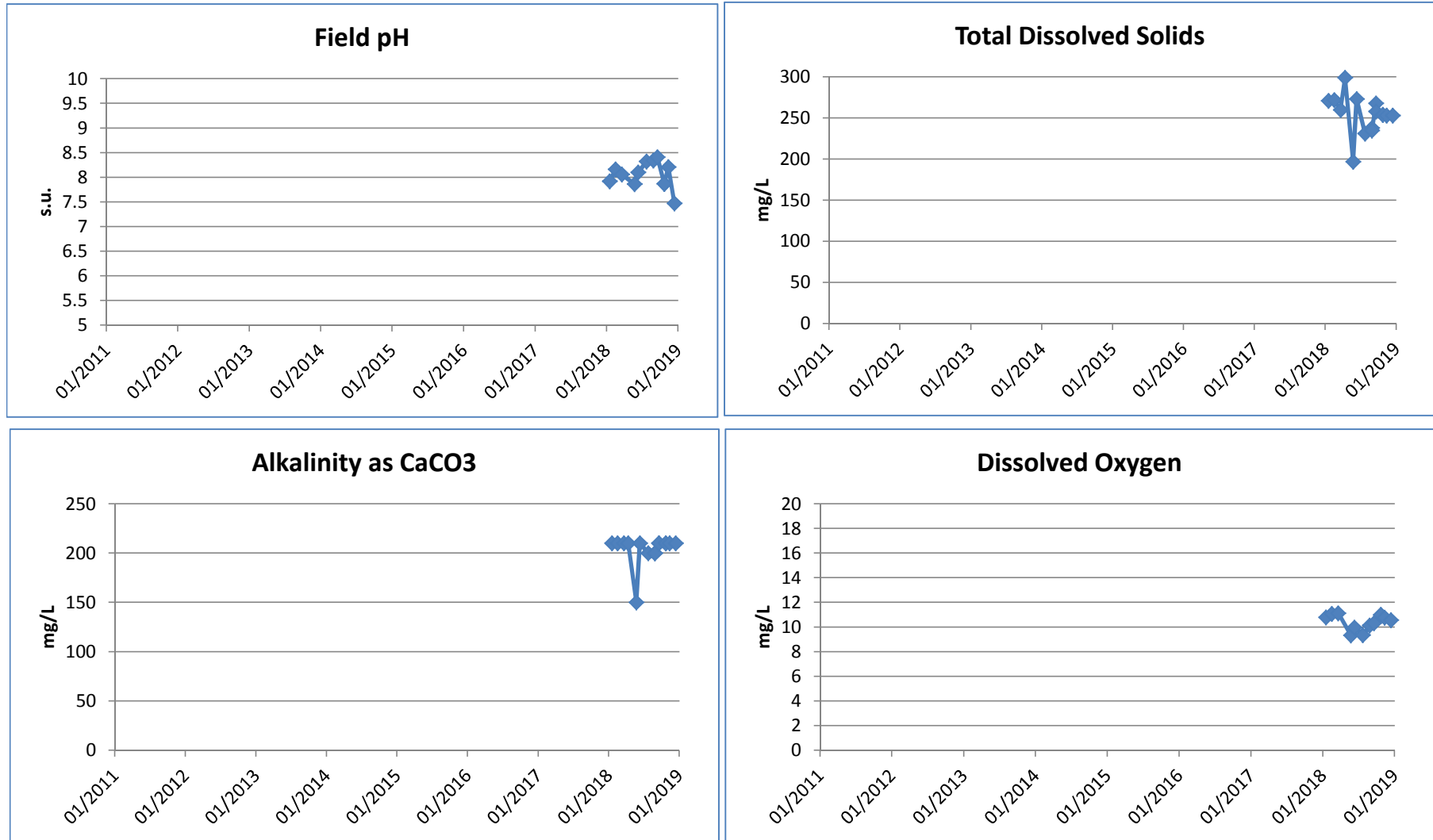
Hydrometrics, Inc.
Consulting Scientists and Engineers

SW-3 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana

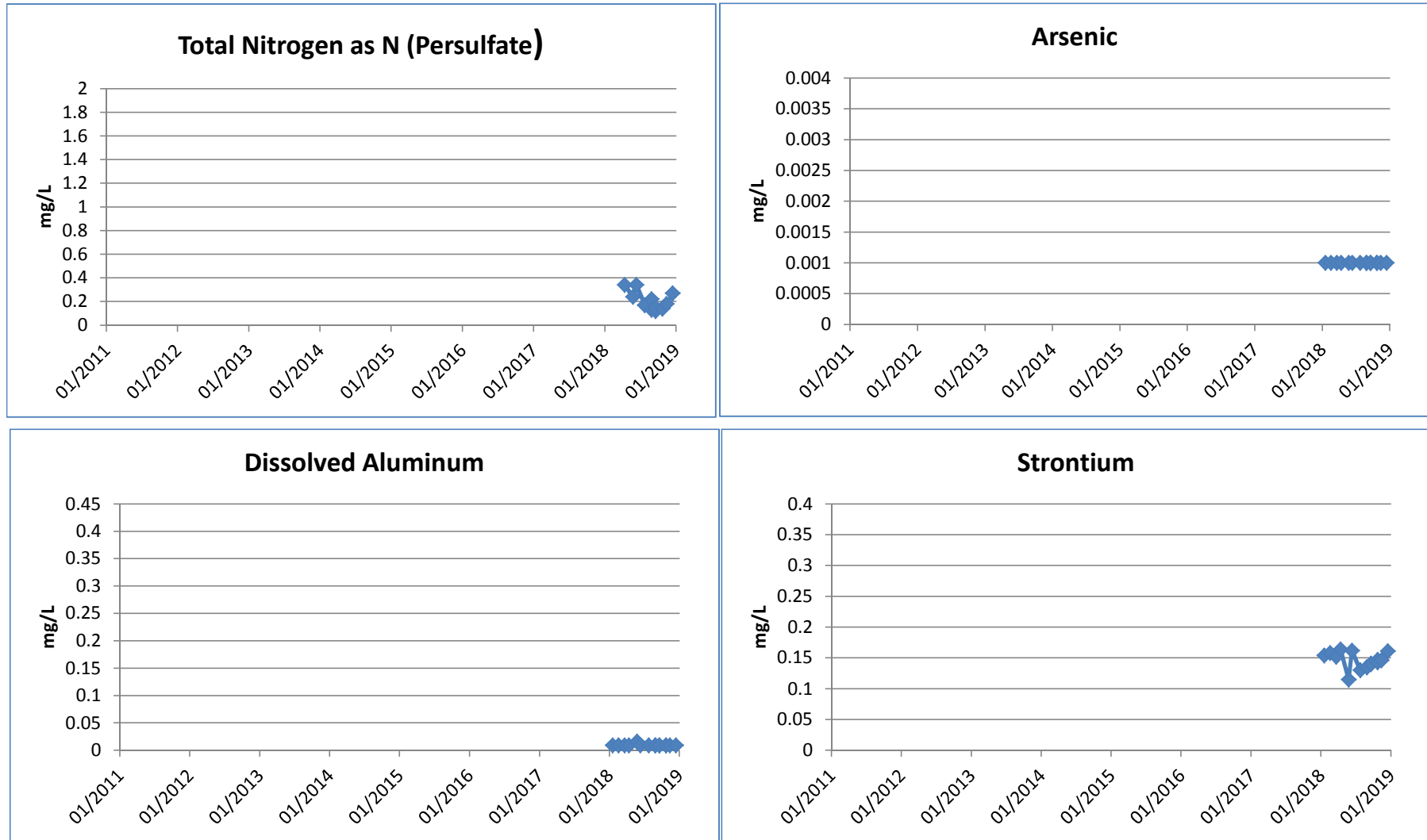
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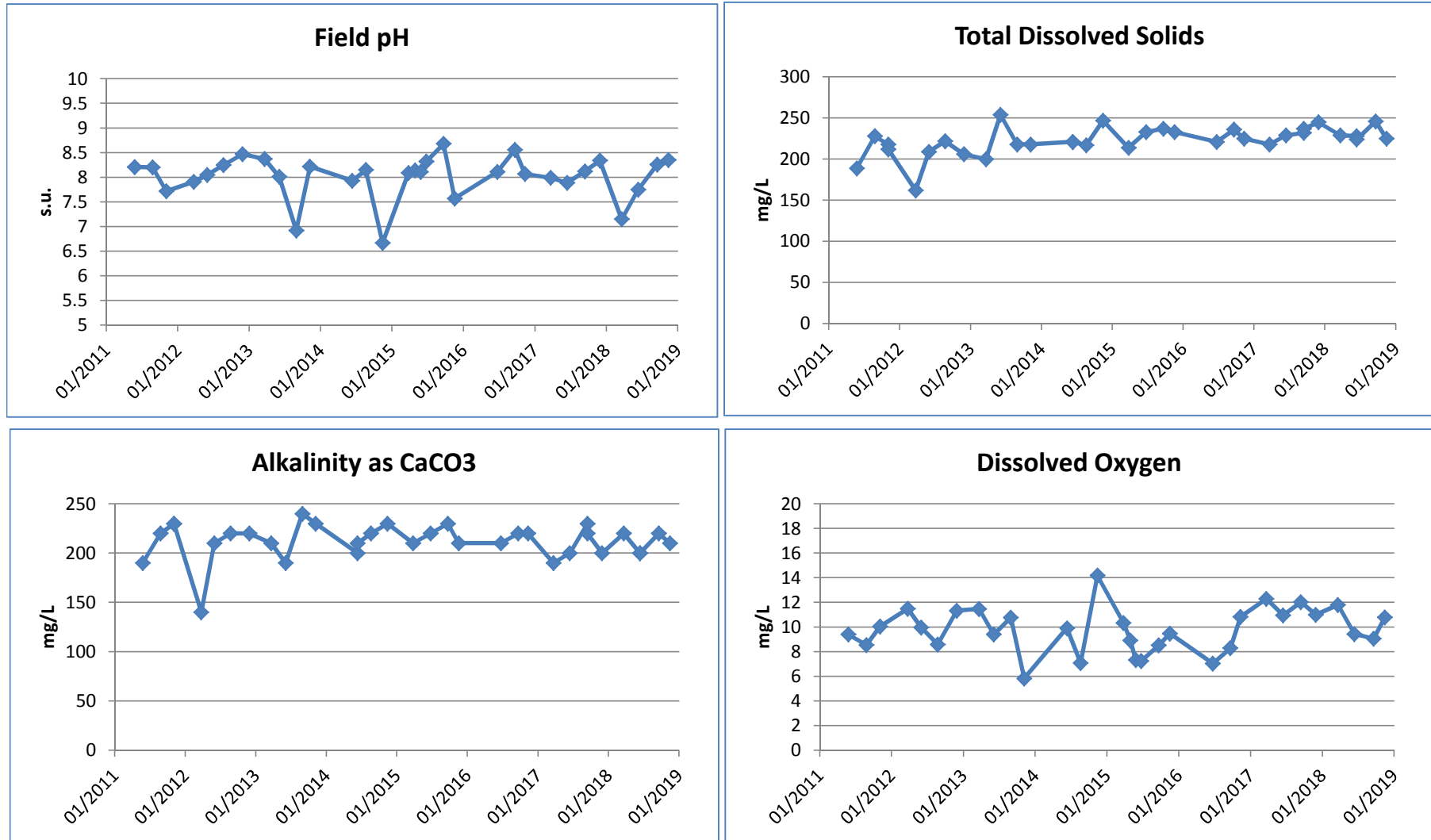
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SW-17



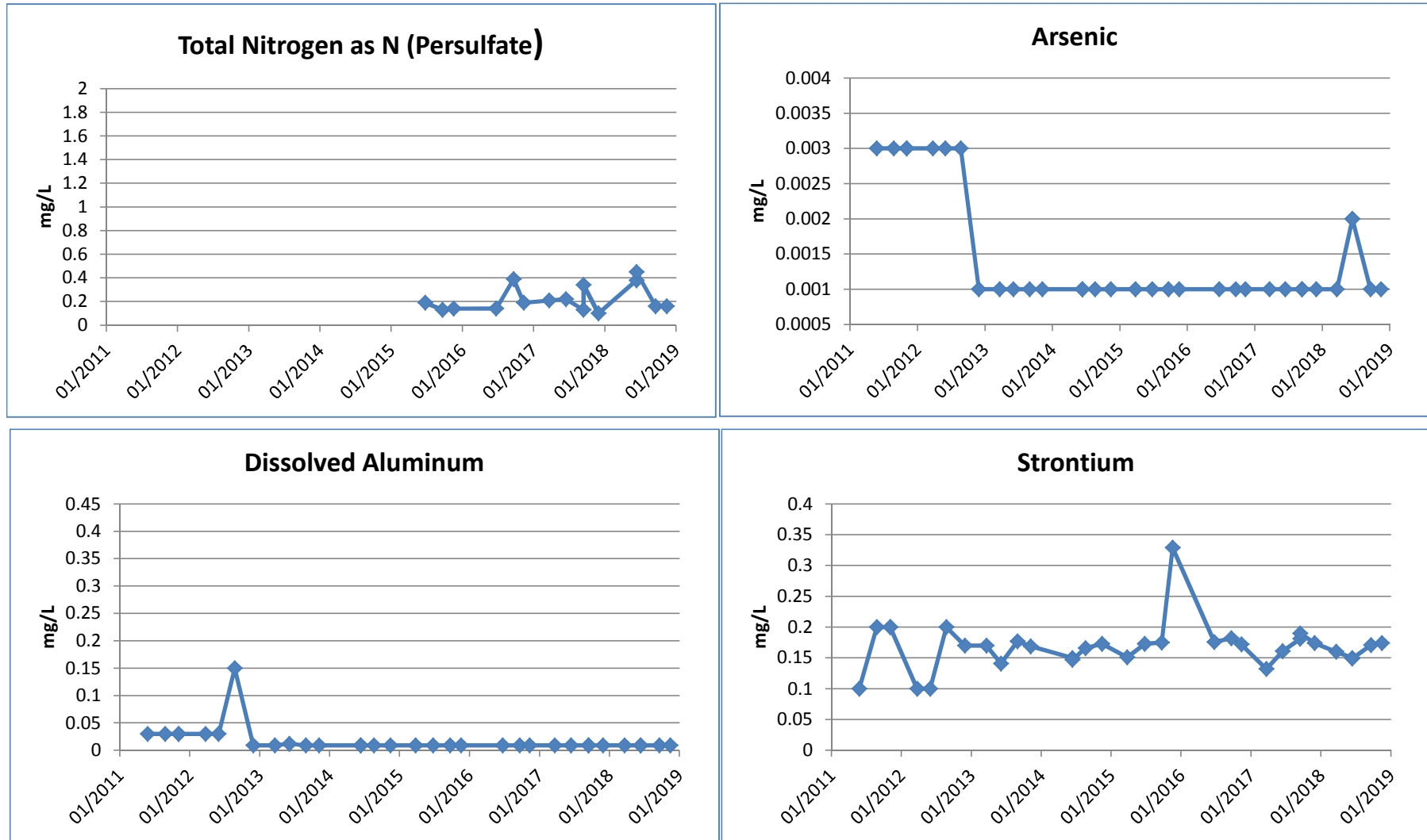
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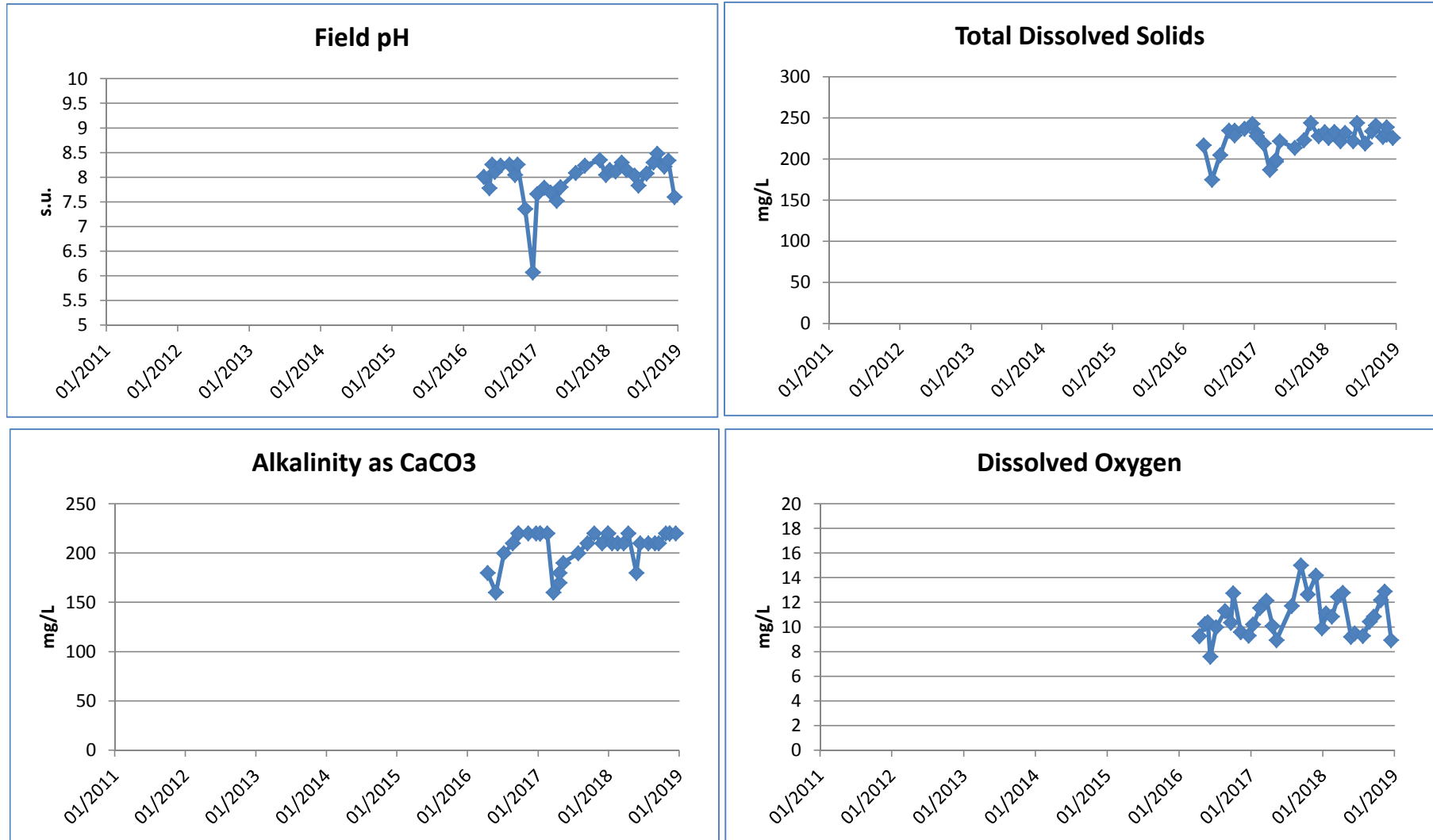
Hydrometrics, Inc.
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SW-6 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana

SW-6



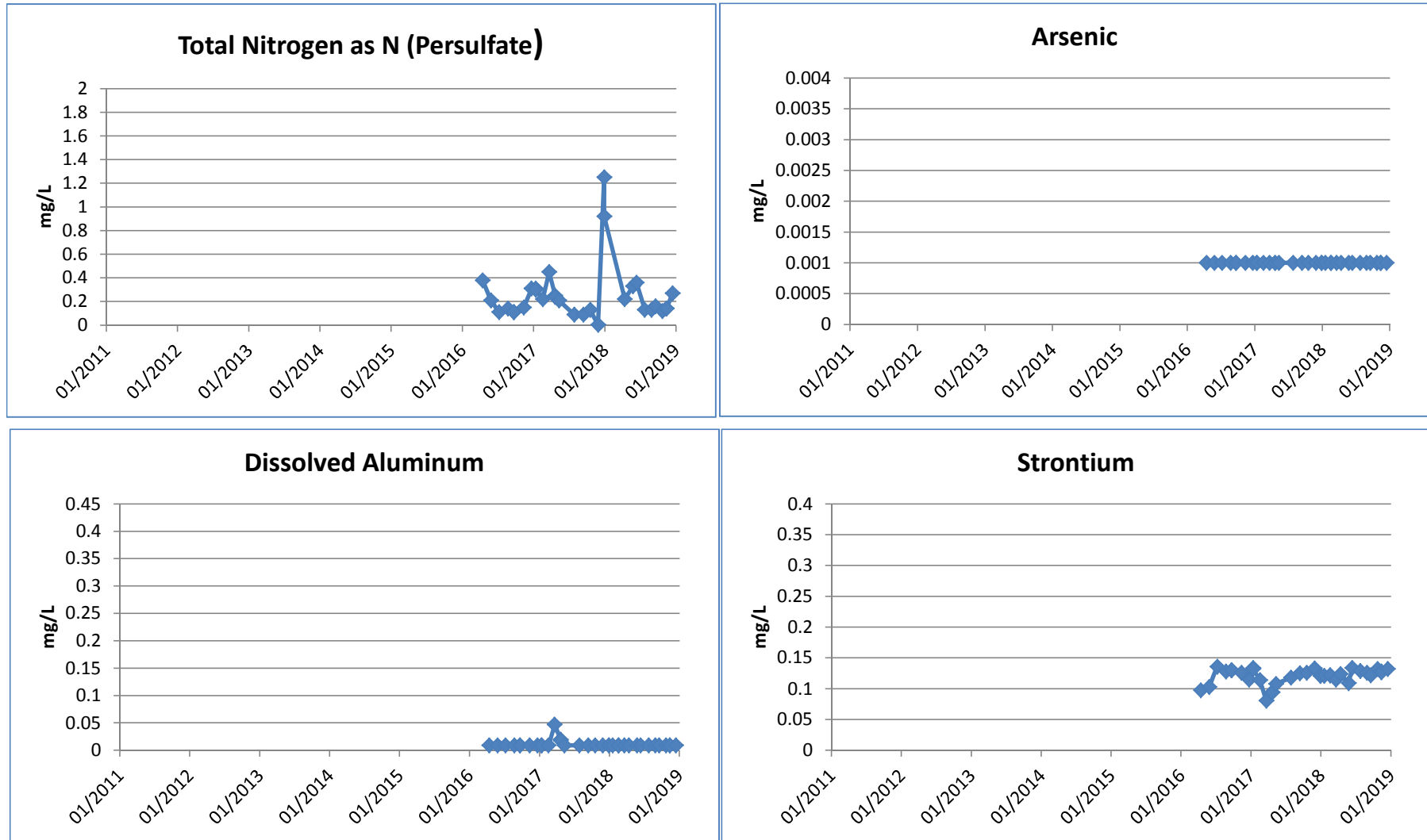
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Hydrometrics, Inc.
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**SW-14 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

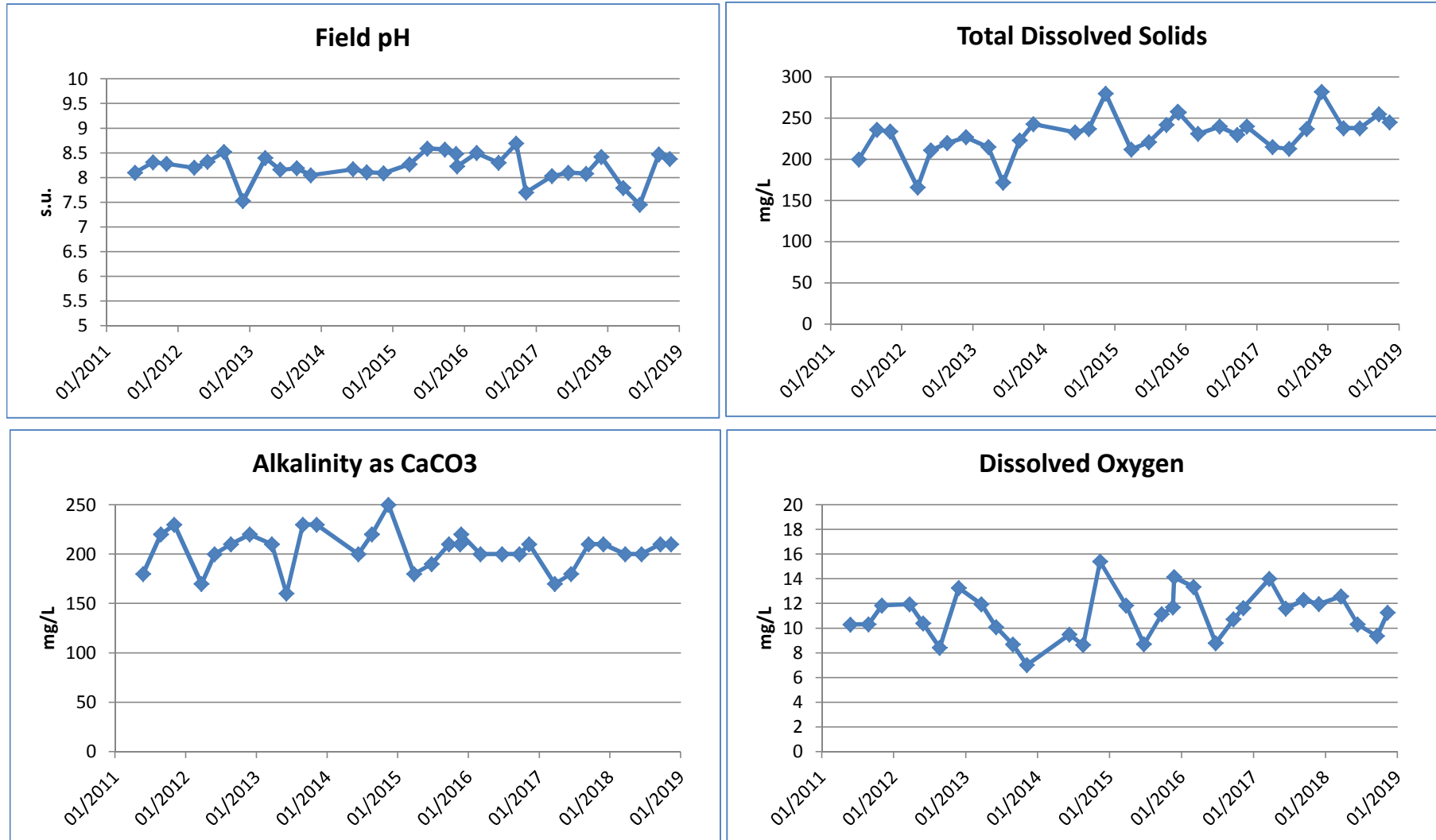
SW-14



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**SW-14 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

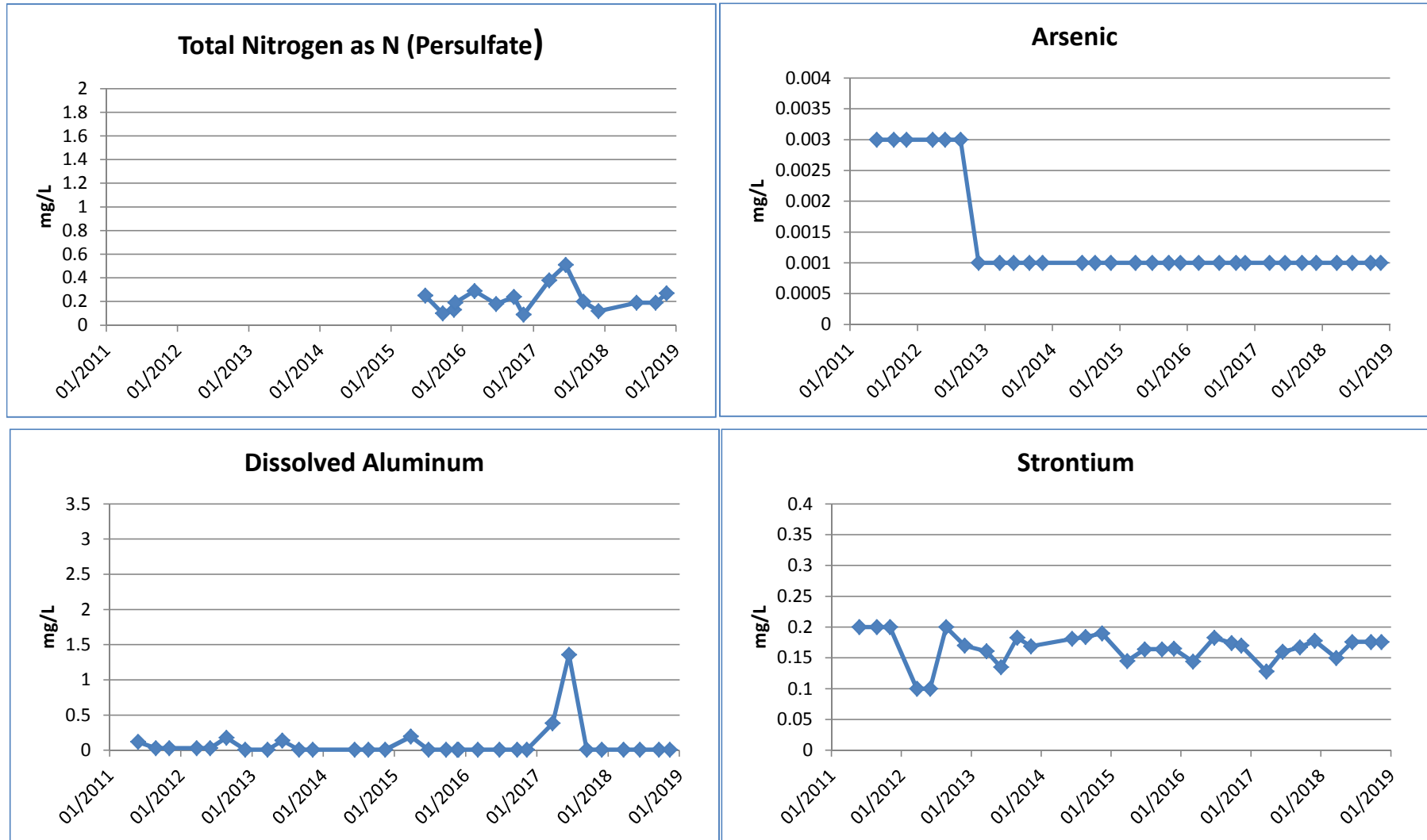
SW-11



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**SW-11 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

SW-11



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**SW-11 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

APPENDIX C

SPRING WATER QUALITY DATA SUMMARY AND TREND GRAPHS

Station Name	Reporting Units	Human Health Standard Groundwater	SP-13	DS-1	DS-1	DS-1	DS-1	DS-1	DS-1	DS-1	DS-1	DS-1	DS-1	DS-1	DS-1	DS-2	DS-2	DS-2	DS-2	DS-2
Sample Date			9/19/18 13:30	1/17/18 14:45	2/16/18 14:30	3/19/18 16:45	4/18/18 10:00	5/23/18 11:30	6/12/18 15:20	7/24/18 16:45	8/28/18 16:40	9/19/18 10:45	10/24/18 11:30	11/15/18 11:50	12/14/18 13:20	1/17/18 14:10	2/16/18 14:50	3/20/18 10:45	5/23/18 11:00	6/12/18 16:50
Sample ID			BBC-1809-138	BBC-1801-117	BBC-1802-113	BBC-1803-110	BBC-1804-119	BBC-1805-102	BBC-1806-118	BBC-1807-112	BBC-1808-113	BBC-1809-129	BBC-1810-113	BBC-1811-118	BBC-1812-117	BBC-1801-115	BBC-1802-115	BBC-1803-114	BBC-1805-101	BBC-1806-121
Lab Name			HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO
Remarks			No Sample	No Sample	No Sample	No Sample	No Sample	--	--	--	--	--	--	--	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample
Lab Sample ID			--	--	--	--	--	H18050624-002	H18060370-003	H18070565-003	H18080620-004	H18090469-006	H18100608-004	H18110402-019	--	--	--	--	--	--
Field Parameters																				
Dissolved Oxygen	mg/L	--	6.02	--	--	--	--	8.17	9.77	9.47	8.55	9.5	8.15	9.74	--	--	--	--	8.28	8.68
Field pH	s.u.	--	7.4	--	--	--	--	7.42	7.87	7.83	7.74	7.72	7.45	7.96	--	--	--	--	7.64	7.5
Field Specific Conductivity	umhos/cm	--	323	--	--	--	--	416	430	424	421	423	415	409	--	--	--	--	153	243
Flow	Gallons Per Min	--	NF	NF-DRY	NF-DRY	NF-DRY	NF-DRY	62.27	29.56	14.92	6.3	1.5	2.6	0.94	NF-DRY	NF-DRY	NF-DRY	NF-ICE	9.4	2.7
Water Temperature	Deg C	--	7.4	--	--	--	--	5.8	8.8	8.1	7.2	8.4	6	5	--	--	--	--	5.6	10.9
Physical Parameters																				
Total Dissolved Solids	mg/L	--	--	--	--	--	--	237	242	228	228	225	226	221	--	--	--	--	--	--
Total Suspended Solids	mg/L	--	--	--	--	--	--	<10	<10	<10	<10	<10	158	40 J	--	--	--	--	--	--
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	210	210	220	210	220	220	210	--	--	--	--	--	--
Calcium (DIS)	mg/L	--	--	--	--	--	--	56	59	55	57	57	60	57	--	--	--	--	--	--
Chloride	mg/L	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	--	--	--	--	--	--
Fluoride	mg/L	4	--	--	--	--	--	0.1	0.1	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--	--
Hardness as CaCO3	mg/L	--	--	--	--	--	--	221	234	223	224	229	238	231	--	--	--	--	--	--
Magnesium (DIS)	mg/L	--	--	--	--	--	--	20	21	21	20	21	22	21	--	--	--	--	--	--
Potassium (DIS)	mg/L	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	--	--	--	--	--	--
Sodium (DIS)	mg/L	--	--	--	--	--	--	2	2	2	2	2	2	2	--	--	--	--	--	--
Sulfate	mg/L	--	--	--	--	--	--	13	13	15	16	15	18	17	--	--	--	--	--	--
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	--	--	--	--	--	0.17	0.18	0.22	0.24	0.23	0.13	0.15	--	--	--	--	--	--
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	--	--	--	--	--	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	--	--	--	--	--	--
Antimony (DIS)	mg/L	0.006	--	--	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	--	--	--	--	--
Arsenic (DIS)	mg/L	0.01	--	--	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--	--
Barium (DIS)	mg/L	1	--	--	--	--	--	0.047	0.05	0.048	0.049	0.047	0.056	0.054	--	--	--	--	--	--
Beryllium (DIS)	mg/L	0.004	--	--	--	--	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	--	--	--	--	--
Cadmium (DIS)	mg/L	0.005	--	--	--	--	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--	--	--	--	--	--
Chromium (DIS)	mg/L	0.1	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--
Cobalt (DIS)	mg/L	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--
Copper (DIS)	mg/L	1.3	--	--	--	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--	--
Iron (DIS)	mg/L	--	--	--	--	--	--	<0.02	<0.02	<0.02	0.04	0.06	<0.02	<0.02	--	--	--	--	--	--
Lead (DIS)	mg/L	0.015	--	--	--	--	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	--	--	--	--
Manganese (DIS)	mg/L	--	--	--	--	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--
Mercury (DIS)	mg/L	0.002	--	--	--	--	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	--	--	--	--	--
Molybdenum (DIS)	mg/L	--	--	--	--	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--	--
Nickel (DIS)	mg/L	0.1	--	--	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--	--
Selenium (DIS)	mg/L	0.05	--	--	--	--	--	<0.0002	<0.0002	0.0002	<0.0002	0.0002	0.0002	<0.0002	--	--	--	--	--	--
Silver (DIS)	mg/L	0.1	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--
Strontium (DIS)	mg/L	4	--	--	--	--	--	0.104	0.108	0.104	0.107	0.106	0.119	0.116	--	--	--	--	--	--
Thallium (DIS)	mg/L	0.002	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--
Uranium (DIS)	mg/L	0.03	--	--	--	--	--	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0007	--	--	--	--	--	--
Zinc (DIS)	mg/L	2	--	--	--	--	--	0.009	0.009	0.002	0.004	0.005	<0.002	<0.002	--	--	--	--	--	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

Human Health Standard Groundwater

Source:
Montana DEQ-7 May 2017

Station Name	Reporting Units	Human Health Standard Groundwater	DS-2	DS-2	DS-2	DS-2	DS-2	DS-2	DS-3	DS-3	DS-3	DS-3	DS-3	DS-3	DS-3	DS-3	DS-3	DS-3	DS-3	DS-3	DS-3
Sample Date			7/24/18 15:55	8/28/18 16:10	9/18/18 12:15	10/23/18 17:00	11/15/18 14:20	12/14/18 12:50	1/17/18 13:00	2/16/18 15:15	3/20/18 15:35	4/12/18 13:55	5/23/18 13:00	6/13/18 08:45	7/25/18 09:05	8/29/18 09:30	8/29/18 09:45	9/18/18 16:00	10/24/18 09:00	11/15/18 15:40	12/14/18 10:40
Sample ID			BBC-1807-111	BBC-1808-112	BBC-1809-111	BBC-1810-112	BBC-1811-120	BBC-1812-115	BBC-1801-106	BBC-1802-116	BBC-1803-124	BBC-1804-107	BBC-1805-104	BBC-1806-125	BBC-1807-115	BBC-1808-117	BBC-1808-118	BBC-1809-120	BBC-1810-115	BBC-1811-123	BBC-1812-109
Lab Name			HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO
Remarks			No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	--	--	--	--	Duplicate	--	No Sample	No Sample	No Sample
Lab Sample ID			--	--	--	--	--	--	--	--	--	--	H18050624-004	H18060370-009	H18070565-006	H18080620-008	H18080620-009	H18090469-001	--	--	--
Field Parameters																					
Dissolved Oxygen	mg/L	--	5.37	4.4	8.36	6.5	--	--	--	--	--	--	6.97	6.26	4.49	5.04	--	8.7	--	--	--
Field pH	s.u.	--	7.38	7.72	8.12	7	--	--	--	--	--	--	8.01	6.87	5.71	7.68	--	7.16	--	--	--
Field Specific Conductivity	umhos/cm	--	324	372	367	388	--	--	--	--	--	--	47	48	56	78	--	56	--	--	--
Flow	Gallons Per Min	--	1.04	0.41	0.26	0.22	NM-ICE	NM-ICE	NF-DRY	NF-DRY	NF-DRY	NF-ICE	159	16.85	10	1.84	--	0.69	NF-DRY	NM-DRY	NF-DRY
Water Temperature	Deg C	--	11.2	8.4	12.4	3.9	--	--	--	--	--	--	5	5.5	10.4	10.9	--	15.1	--	--	--
Physical Parameters																					
Total Dissolved Solids	mg/L	--	--	--	--	--	--	--	--	--	--	--	73	68	67	53	53	61	--	--	--
Total Suspended Solids	mg/L	--	--	--	--	--	--	--	--	--	--	--	<10	<10	<10	<10	<10	<10	--	--	--
Major Constituents - Commons Ions																					
Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	19	20	23	23	23	24	--	--	--
Calcium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	5	6	5	6	6	6	--	--	--
Chloride	mg/L	--	--	--	--	--	--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	--	--	--
Fluoride	mg/L	4	--	--	--	--	--	--	--	--	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--	--	--
Hardness as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	19	21	20	22	23	23	--	--	--
Magnesium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	1	2	2	2	2	2	--	--	--
Potassium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	<1	1	<1	1	1	1	--	--	--
Sodium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	1	1	1	2	2	2	--	--	--
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	1	1	1	2	2	2	--	--	--
Nutrients																					
Nitrate + Nitrite as N	mg/L	10	--	--	--	--	--	--	--	--	--	--	0.17	0.2	0.21	0.34	0.34	0.39	--	--	--
Metals - Trace Constituents																					
Aluminum (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	1.41	1.36	0.114	1.21	1.28	0.347	--	--	--
Antimony (DIS)	mg/L	0.006	--	--	--	--	--	--	--	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	--	--
Arsenic (DIS)	mg/L	0.01	--	--	--	--	--	--	--	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--
Barium (DIS)	mg/L	1	--	--	--	--	--	--	--	--	--	--	0.244	0.252	0.241	0.279	0.29	0.271	--	--	--
Beryllium (DIS)	mg/L	0.004	--	--	--	--	--	--	--	--	--	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	--	--
Cadmium (DIS)	mg/L	0.005	--	--	--	--	--	--	--	--	--	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--	--	--
Chromium (DIS)	mg/L	0.1	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--
Cobalt (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--
Copper (DIS)	mg/L	1.3	--	--	--	--	--	--	--	--	--	--	0.004	0.005	<0.002	0.002	0.002	<0.002	--	--	--
Iron (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	0.83 J	0.85	0.08	0.7	0.75	0.16	--	--	--
Lead (DIS)	mg/L	0.015	--	--	--	--	--	--	--	--	--	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	--
Manganese (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--
Mercury (DIS)	mg/L	0.002	--	--	--	--	--	--	--	--	--	--	0.0000123	<0.000005	0.000006	0.000006	0.000006	<0.000005	--	--	--
Molybdenum (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--
Nickel (DIS)	mg/L	0.1	--	--	--	--	--	--	--	--	--	--	0.005	0.004	0.003	0.003	0.003	0.003	--	--	--
Selenium (DIS)	mg/L	0.05	--	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--
Silver (DIS)	mg/L	0.1	--	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--
Strontium (DIS)	mg/L	4	--	--	--	--	--	--	--	--	--	--	0.0256	0.0274	0.0278	0.0292	0.0307	0.0306	--	--	--
Thallium (DIS)	mg/L	0.002	--	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--
Uranium (DIS)	mg/L	0.03	--	--	--	--	--	--	--	--	--	--	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	--	--	--
Zinc (DIS)	mg/L	2	--	--	--	--	--	--	--	--	--	--	0.005	0.005	<0.002	0.004	0.004	<0.002	--	--	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Human Health Standard Groundwater
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Station Name	Reporting Units	Human Health Standard Groundwater	DS-4	DS-4	DS-4	DS-4	DS-4	DS-4	DS-4	DS-4	DS-4	DS-4	DS-4	DS-4	DS-5	DS-6	SEEP-1	SEEP-2	SEEP-3	SEEP-4
Sample Date			1/17/18 13:10	2/16/18 15:25	3/20/18 15:45	4/12/18 14:00	5/23/18 13:30	6/13/18 09:40	7/25/18 09:40	8/29/18 10:00	9/18/18 16:20	10/24/18 09:20	11/15/18 15:50	12/14/18 11:10	9/18/18 14:45	9/18/18 15:15	9/19/18 11:45	9/19/18 11:50	9/19/18 13:50	9/19/18 14:40
Sample ID			BBC-1801-107	BBC-1802-117	BBC-1803-125	BBC-1804-108	BBC-1805-105	BBC-1806-126	BBC-1807-116	BBC-1808-119	BBC-1809-121	BBC-1810-116	BBC-1811-124	BBC-1812-110	BBC-1809-117	BBC-1809-119	BBC-1809-132	BBC-1809-133	BBC-1809-139	BBC-1809-140
Lab Name			HYDRO	HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO
Remarks			No Sample	No Sample	No Sample	No Sample	--	--	--	--	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample
Lab Sample ID			--	--	--	--	H18050624-005	H18060370-010	H18070565-007	H18080620-010	--	--	--	--	--	--	--	--	--	--
Field Parameters																				
Dissolved Oxygen	mg/L	--	--	--	--	--	8.49	7.58	7.9	7.16	--	--	--	--	--	--	--	6.44	--	2.32
Field pH	s.u.	--	--	--	--	--	7.7	--	6.12	7.45	--	--	--	--	--	--	--	7.6	--	6.9
Field Specific Conductivity	umhos/cm	--	--	--	--	--	73	87	92	115	--	--	--	--	--	--	--	462	--	85
Flow	Gallons Per Min	--	NF-DRY	NF-DRY	NF-DRY	NF-DRY	NM	NM	NM	1.585	NF	NF-DRY	NM-DRY	NF-DRY	NF	NF	NF	NF	NF-DRY	NF
Water Temperature	Deg C	--	--	--	--	--	5.2	6.8	8.7	8.4	--	--	--	--	--	--	--	8.8	--	9.8
Physical Parameters																				
Total Dissolved Solids	mg/L	--	--	--	--	--	96	86	91	82	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	mg/L	--	--	--	--	--	<10	24	<10	<10	--	--	--	--	--	--	--	--	--	--
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	--	--	--	--	38	39	42	51	--	--	--	--	--	--	--	--	--	--
Calcium (DIS)	mg/L	--	--	--	--	--	12	13	13	16	--	--	--	--	--	--	--	--	--	--
Chloride	mg/L	--	--	--	--	--	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--
Fluoride	mg/L	4	--	--	--	--	<0.1	0.1	<0.1	0.1	--	--	--	--	--	--	--	--	--	--
Hardness as CaCO3	mg/L	--	--	--	--	--	40	42	43	50	--	--	--	--	--	--	--	--	--	--
Magnesium (DIS)	mg/L	--	--	--	--	--	3	3	3	3	--	--	--	--	--	--	--	--	--	--
Potassium (DIS)	mg/L	--	--	--	--	--	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--
Sodium (DIS)	mg/L	--	--	--	--	--	1	1	1	2	--	--	--	--	--	--	--	--	--	--
Sulfate	mg/L	--	--	--	--	--	3	2	2	3	--	--	--	--	--	--	--	--	--	--
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	--	--	--	--	0.4	0.29	0.26	0.45	--	--	--	--	--	--	--	--	--	--
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	--	--	--	--	1.52	1.33	0.575	0.118	--	--	--	--	--	--	--	--	--	--
Antimony (DIS)	mg/L	0.006	--	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--	--	--	--	--	--	--	--	--	--
Arsenic (DIS)	mg/L	0.01	--	--	--	--	0.001	0.001	0.001	<0.001	--	--	--	--	--	--	--	--	--	--
Barium (DIS)	mg/L	1	--	--	--	--	0.325	0.316	0.313	0.333	--	--	--	--	--	--	--	--	--	--
Beryllium (DIS)	mg/L	0.004	--	--	--	--	<0.0008	<0.0008	<0.0008	<0.0008	--	--	--	--	--	--	--	--	--	--
Cadmium (DIS)	mg/L	0.005	--	--	--	--	<0.00003	<0.00003	<0.00003	<0.00003	--	--	--	--	--	--	--	--	--	--
Chromium (DIS)	mg/L	0.1	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--
Cobalt (DIS)	mg/L	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--
Copper (DIS)	mg/L	1.3	--	--	--	--	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--	--	--	--	--	--
Iron (DIS)	mg/L	--	--	--	--	--	0.84 J	0.81	0.3	0.11	--	--	--	--	--	--	--	--	--	--
Lead (DIS)	mg/L	0.015	--	--	--	--	0.0003	<0.0003	<0.0003	<0.0003	--	--	--	--	--	--	--	--	--	--
Manganese (DIS)	mg/L	--	--	--	--	--	0.005	<0.005	0.008	0.015	--	--	--	--	--	--	--	--	--	--
Mercury (DIS)	mg/L	0.002	--	--	--	--	0.0000102	<0.000005	<0.000005	<0.000005	--	--	--	--	--	--	--	--	--	--
Molybdenum (DIS)	mg/L	--	--	--	--	--	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--	--	--	--	--	--
Nickel (DIS)	mg/L	0.1	--	--	--	--	0.002	0.002	0.001	0.001	--	--	--	--	--	--	--	--	--	--
Selenium (DIS)	mg/L	0.05	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--	--	--	--	--
Silver (DIS)	mg/L	0.1	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--	--	--	--	--
Strontium (DIS)	mg/L	4	--	--	--	--	0.0424	0.0433	0.0426	0.0503	--	--	--	--	--	--	--	--	--	--
Thallium (DIS)	mg/L	0.002	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--	--	--	--	--
Uranium (DIS)	mg/L	0.03	--	--	--	--	<0.008	<0.008	<0.008	<0.008	--	--	--	--	--	--	--	--	--	--
Zinc (DIS)	mg/L	2	--	--	--	--	0.003	0.004	<0.002	0.012	--	--	--	--	--	--	--	--	--	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Human Health Standard Groundwater
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Station Name	Reporting Units	Human Health Standard Groundwater	SEEP-5	SEEP-6	SEEP-8	SEEP-9	SEEP-10	SP-1	SP-2	SP-3	SP-3	SP-3	SP-3	SP-3	SP-3	SP-3	SP-3	SP-3	SP-3	SP-3
Sample Date			9/19/18 15:00	9/19/18 14:50	9/19/18 12:20	9/18/18 15:00	9/19/18 11:30	9/19/18 12:00	9/18/18 17:00	1/17/18 13:20	2/16/18 15:50	3/20/18 16:00	4/12/18 14:15	5/23/18 13:45	6/13/18 10:00	7/25/18 10:00	8/29/18 10:20	9/18/18 16:45	10/24/18 09:45	11/16/18 13:00
Sample ID			BBC-1809-142	BBC-1809-141	BBC-1809-135	BBC-1809-118	BBC-1809-131	BBC-1809-134	BBC-1809-123	BBC-1801-108	BBC-1802-118	BBC-1803-126	BBC-1804-109	BBC-1805-106	BBC-1806-127	BBC-1807-117	BBC-1808-120	BBC-1809-122	BBC-1810-117	BBC-1811-129
Lab Name			HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks			No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	--	--	--	--	--	--	--
Lab Sample ID			--	--	--	--	--	--	z	--	--	--	--	H18050624-006	H18060370-011	H18070565-008	H18080620-011	H18090469-002	H18100608-006	H18110402-027
Field Parameters																				
Dissolved Oxygen	mg/L	--	2.32	0.01	--	--	7.04	6.82	--	--	--	--	--	8.54	8.56	8.28	9.07	6	19.38	10.2
Field pH	s.u.	--	6.44	6.52	--	--	7.6	7.58	--	--	--	--	--	7.21	--	6.6	7.28	6.88	6.21	7.85
Field Specific Conductivity	umhos/cm	--	117	365	--	--	377	424	--	--	--	--	--	112	125	157	189	196	211	202
Flow	Gallons Per Min	--	NF	NF	NF	NF	2.6	NF	NF-DRY	NF-DRY	NF-DRY	NF-DRY	NF-ICE	5.4	0.94	0.94	0.31	0.009	0.13	0.13
Water Temperature	Deg C	--	9.6	9.7	--	--	8.6	8.1	--	--	--	--	--	5.1	7.4	10.4	8.6	15.8	3.4	1.7
Physical Parameters																				
Total Dissolved Solids	mg/L	--	--	--	--	--	--	--		--	--	--	--	157	134	127	125	124	132	129
Total Suspended Solids	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	<10	37	14	<10	10	44	<10
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--		--	--	--	--	44	54	72	89	96	100	98
Calcium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	14	18	22	27	29	30	29
Chloride	mg/L	--	--	--	--	--		--	--	--	--	--	--	<1	<1	<1	<1	<1	<1	<1
Fluoride	mg/L	4	--	--	--	--	--	--	--	--	--	--	--	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardness as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	48	61	74	89	98	103	102
Magnesium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	3	4	5	6	6	7	7
Potassium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	2	1	1	1	1	1	1
Sodium (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	2	2	2	3	3	3	3
Sulfate	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	4	4	5	6	6	7	6
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	--	--	--	--	--	--		--	--	--	--	0.33	0.27	0.25	0.24	0.18	0.24	0.32
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	1.97	1.61	0.365	0.048	0.059	0.033	0.074
Antimony (DIS)	mg/L	0.006	--	--	--	--	--	--	--	--	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (DIS)	mg/L	0.01	--	--	--	--	--	--	--	--	--	--	--	0.002	0.002	0.002	0.001	0.001	0.001	0.002
Barium (DIS)	mg/L	1	--	--	--	--	--	--	--	--	--	--	--	0.205	0.231	0.254	0.292	0.302	0.306	0.304
Beryllium (DIS)	mg/L	0.004	--	--	--	--	--	--	--	--	--	--	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Cadmium (DIS)	mg/L	0.005	--	--	--	--	--	--	--	--	--	--	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Chromium (DIS)	mg/L	0.1	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper (DIS)	mg/L	1.3	--	--	--	--	--	--	--	--	--	--	--	0.006	0.004	0.002	<0.002	<0.002	<0.002	<0.002
Iron (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	1.21 J	1.01	0.16	0.07	0.03	0.02	0.03
Lead (DIS)	mg/L	0.015	--	--	--	--	--	--	--	--	--	--	--	0.0004	0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Manganese (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.008	0.007	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury (DIS)	mg/L	0.002	--	--	--	--	--	--	--	--	--	--	--	0.0000187	0.000018	0.0000053	<0.000005	<0.000005	<0.000005	<0.000005
Molybdenum (DIS)	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (DIS)	mg/L	0.1	--	--	--	--	--	--	--	--	--	--	--	0.003	0.003	0.001	<0.001	<0.001	<0.001	<0.001
Selenium (DIS)	mg/L	0.05	--	--	--	--	--	--	--	--	--	--	--	0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silver (DIS)	mg/L	0.1	--	--	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Strontium (DIS)	mg/L	4	--	--	--	--	--	--	--	--	--	--	--	0.0439	0.0541	0.0634	0.0784	0.083	0.0878	0.0887
Thallium (DIS)	mg/L	0.002	--	--	--	--	--	--	--	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Uranium (DIS)	mg/L	0.03	--	--	--	--	--	--	--	--	--	--	--	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0003
Zinc (DIS)	mg/L	2	--	--	--	--	--	--	--	--	--	--	--	0.005	0.005	<0.002	0.003	<0.002	<0.002	0.007

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Human Health Standard Groundwater
--	-----------------------------------

Station Name	Reporting Units	Human Health Standard Groundwater	SP-3	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-4	SP-5	SP-5	SP-6
Sample Date			12/14/18 11:30	1/17/18 13:55	2/16/18 12:45	3/19/18 13:20	4/12/18 14:40	4/12/18 15:00	5/23/18 14:40	6/12/18 16:10	7/25/18 11:15	8/29/18 11:25	9/18/18 17:40	10/24/18 10:50	11/15/18 14:45	12/14/18 12:00	12/14/18 12:15	8/28/18 17:00	10/23/18 17:55	1/17/18 00:00
Sample ID			BBC-1812-111	BBC-1801-110	BBC-1802-108	BBC-1803-108	BBC-1804-111	BBC-1804-112	BBC-1805-108	BBC-1806-120	BBC-1807-120	BBC-1808-122	BBC-1809-125	BBC-1810-119	BBC-1811-121	BBC-1812-113	BBC-1812-114	BBC-1808-114	BBC-1810-114	BBC-1801-120
Lab Name			HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO
Remarks			No Sample	--	--	--	--	Duplicate	--	--	--	--	--	--	--	--	Duplicate	--	--	No Sample
Lab Sample ID			--	H18010281-001	H18020279-002	H18030349-001	H18040275-001	H18040275-002	H18050624-008	H18060370-005	H18070565-011	H18080620-013	H18090469-004	H18100608-008	H18110402-021	H18120295-003	H18120295-004	H18080620-005	H18100608-005	--
Field Parameters																				
Dissolved Oxygen	mg/L	--	--	9.93	10.34	10.66	11.22	--	7.97	9.81	9.27	10.48	9.14	8.25	9.38	9.47	--	6.18	7.4	--
Field pH	s.u.	--	--	7.75	7.96	8.16	7.88	--	7.54	7.49	7.38	7.67	7.64	7.84	7.86	7.63	--	7.67	7.28	--
Field Specific Conductivity	umhos/cm	--	--	471	462	455	446	--	449	444	449	425	431	428	453	440	--	414	389	--
Flow	Gallons Per Min	--	NF-DRY	NF-ICE	NF-ICE	NM-ICE	NM-ICE	--	50.27	34.56	13	9.43	8.1	5.39	5.39	0.58	--	0.6	0.94	NF-DRY
Water Temperature	Deg C	--	--	4	4.4	4.2	4	--	6.1	7.2	--	7.9	7.5	7	6.7	6	--	8.5	5.2	--
Physical Parameters																				
Total Dissolved Solids	mg/L	--	--	256	258	257	256	261	264	256	255	249	237	237	254	222	219	228	224	--
Total Suspended Solids	mg/L	--	--	173	<10	<10	57	19	11	50	15	<10	47	34	130 J	23 J	54 J	137 J	28	--
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	--	200	200	200	190	200	200	200	200	200	200	200	210	200	200	220	220	--
Calcium (DIS)	mg/L	--	--	50	53	55	52	52	52	52	49	49	49	51	49	53	54	59	60	--
Chloride	mg/L	--	--	<1	<1	<1	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--
Fluoride	mg/L	4	--	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	<0.1	--
Hardness as CaCO3	mg/L	--	--	232	245	253	242	242	238	241	233	224	225	234	238	246	247	221	225	--
Magnesium (DIS)	mg/L	--	--	26	27	28	27	27	27	27	25	25	26	28	27	27	18	19	--	--
Potassium (DIS)	mg/L	--	--	2	2	2	2	2	2	2	2	2	2	2	2	2	2	<1	<1	--
Sodium (DIS)	mg/L	--	--	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	--
Sulfate	mg/L	--	--	42	42	43	42	42	41	35	37	35	34	39	41	37	37	10	11	--
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	--	0.25	0.24	0.18	0.18	0.18	0.22	0.26	0.27	0.31	0.31	0.25	0.27	0.28	0.28	0.04	0.02	--
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	--	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	--
Antimony (DIS)	mg/L	0.006	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--
Arsenic (DIS)	mg/L	0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--
Barium (DIS)	mg/L	1	--	0.112	0.111	0.119	0.101	0.102	0.111	0.118	0.106	0.113	0.106	0.114	0.112	0.115	0.115	0.053	0.059	--
Beryllium (DIS)	mg/L	0.004	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--
Cadmium (DIS)	mg/L	0.005	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--
Chromium (DIS)	mg/L	0.1	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cobalt (DIS)	mg/L	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--
Copper (DIS)	mg/L	1.3	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.017	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--
Iron (DIS)	mg/L	--	--	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	--
Lead (DIS)	mg/L	0.015	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--
Manganese (DIS)	mg/L	--	--	<0.005	<0.005	<0.005	0.01	0.012	0.008	0.011	0.006	<0.005	<0.005	0.006	<0.005	0.006	<0.005	<0.005	0.017	--
Mercury (DIS)	mg/L	0.002	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--
Molybdenum (DIS)	mg/L	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--
Nickel (DIS)	mg/L	0.1	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--
Selenium (DIS)	mg/L	0.05	--	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0004	<0.0002	<0.0002	--
Silver (DIS)	mg/L	0.1	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--
Strontium (DIS)	mg/L	4	--	0.0762	0.0763	0.0816	0.0703	0.0697	0.0739	0.0764	0.0706	0.0704	0.0711	0.0743	0.074	0.0717	0.0735	0.131	0.141	--
Thallium (DIS)	mg/L	0.002	--	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003	0.0003	<0.0002	<0.0002	--
Uranium (DIS)	mg/L	0.03	--	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0004	0.0005	0.0005	<0.008	<0.008	--
Zinc (DIS)	mg/L	2	--	<0.002	<0.002	0.003	0.002	0.004	<0.002	0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Human Health Standard Groundwater
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Station Name	Reporting Units	Human Health Standard Groundwater	SP-6	SP-6	SP-6	SP-6	SP-6	SP-6	SP-6	SP-6	SP-6	SP-6	SP-6	SP-6	SP-7	SP-7	SP-7	SP-7	SP-7	SP-7
Sample Date			2/16/18 16:30	3/19/18 13:05	4/12/18 14:30	5/23/18 14:20	6/13/18 10:30	7/25/18 10:50	7/25/18 11:05	8/29/18 11:00	9/18/18 17:25	10/24/18 10:15	11/15/18 15:10	12/14/18 11:40	1/17/18 16:00	1/17/18 16:30	2/16/18 13:30	2/16/18 14:00	3/20/18 13:30	3/20/18 13:50
Sample ID			BBC-1802-119	BBC-1803-107	BBC-1804-110	BBC-1805-107	BBC-1806-128	BBC-1807-118	BBC-1807-119	BBC-1808-121	BBC-1809-124	BBC-1810-118	BBC-1811-122	BBC-1812-112	BBC-1801-111	BBC-1801-112	BBC-1802-109	BBC-1802-110	BBC-1803-118	BBC-1803-119
Lab Name			HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks			No Sample	No Sample	No Sample	--	--	--	Duplicate	--	--	--	--	--	--	Duplicate	--	Duplicate	--	Duplicate
Lab Sample ID			--	--	--	H18050624-007	H18060370-012	H18070565-009	H18070565-010	H18080620-012	H18090469-003	H18100608-007	H18110402-022	H18120295-002	H18010281-002	H18010281-003	H18020279-003	H18020279-004	H18030349-002	H18030349-003
Field Parameters																				
Dissolved Oxygen	mg/L	--	--	--	--	8.53	8.72	8.96	--	9.91	8.68	8	9.75	9.89	2.64	--	4.1	--	4.52	--
Field pH	s.u.	--	--	--	--	7.37	7.45	6.82	--	7.54	7.43	7.8	7.82	7.66	7.24	--	7.58	--	7.45	--
Field Specific Conductivity	umhos/cm	--	--	--	--	247	261	274	--	280	281	276	283	287	344	--	337	--	329	--
Flow	Gallons Per Min	--	NF-DRY	NM-ICE	NM-ICE	3.23	2.7	2.2	--	1.74	1.3	0.86	0.53	NM	11.2	--	15.26	--	NM-ICE	--
Water Temperature	Deg C	--	--	--	--	6.1	7.1	--	--	7.8	8.3	7.1	6.6	4.6	6.2	--	6	--	5.9	--
Physical Parameters																				
Total Dissolved Solids	mg/L	--	--	--	--	161	157	160	161	166	168	163	160	146	185	186	191	189	188	185
Total Suspended Solids	mg/L	--	--	--	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	10	15	48 J	25 J	10	<10
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	--	--	--	130	130	130	130	130	140	140	140	140	160	160	160	160	170	170
Calcium (DIS)	mg/L	--	--	--	--	33	35	34	34	35	37	37	37	38	41	41	43	43	45	45
Chloride	mg/L	--	--	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	2	2	2	2	2
Fluoride	mg/L	4	--	--	--	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Hardness as CaCO3	mg/L	--	--	--	--	133	139	140	137	138	146	145	147	151	159	161	168	169	176	173
Magnesium (DIS)	mg/L	--	--	--	--	12	13	13	13	12	13	13	13	14	14	14	15	15	15	15
Potassium (DIS)	mg/L	--	--	--	--	<1	<1	<1	<1	<1	<1	1	<1	<1	2	2	3	3	2	2
Sodium (DIS)	mg/L	--	--	--	--	2	2	2	2	2	2	2	2	2	4	4	5	4	4	4
Sulfate	mg/L	--	--	--	--	9	9	10	10	10	10	12	12	11	10	10	10	10	9	9
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	--	--	--	0.53	0.43	0.37	0.37	0.42	0.4	0.34	0.38	0.37	0.31	0.31	0.29	0.29	0.32	0.31
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	--	--	--	0.025	<0.009	<0.009	<0.009	<0.009	<0.009	0.032	0.014	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Antimony (DIS)	mg/L	0.006	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (DIS)	mg/L	0.01	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	0.004	0.004	0.004	0.004	0.004
Barium (DIS)	mg/L	1	--	--	--	0.176	0.185	0.185	0.186	0.194	0.184	0.21	0.201	0.195	0.114	0.113	0.113	0.113	0.122	0.122
Beryllium (DIS)	mg/L	0.004	--	--	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Cadmium (DIS)	mg/L	0.005	--	--	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Chromium (DIS)	mg/L	0.1	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt (DIS)	mg/L	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper (DIS)	mg/L	1.3	--	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron (DIS)	mg/L	--	--	--	--	<0.02	<0.02	<0.02	<0.02	0.05	0.05	0.19	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Lead (DIS)	mg/L	0.015	--	--	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Manganese (DIS)	mg/L	--	--	--	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.073	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Mercury (DIS)	mg/L	0.002	--	--	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Molybdenum (DIS)	mg/L	--	--	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (DIS)	mg/L	0.1	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (DIS)	mg/L	0.05	--	--	--	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	0.0002	<0.0002	<0.0002	0.0003	0.0003	0.0003	0.0003	0.0002	0.0003
Silver (DIS)	mg/L	0.1	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Strontium (DIS)	mg/L	4	--	--	--	0.0689	0.0716	0.0694	0.0696	0.0731	0.075	0.0757	0.0761	0.0737	0.17	0.171	0.171	0.172	0.181	0.18
Thallium (DIS)	mg/L	0.002	--	--	--	0.0004	0.0004	0.0005	0.0005	0.0005	0.0005	0.0004	0.0005	0.0005	0.001	0.001	0.001	0.001	0.001	0.001
Uranium (DIS)	mg/L	0.03	--	--	--	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0004	0.0004	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Zinc (DIS)	mg/L	2	--	--	--	<0.002	<0.002	<0.002	<0.002	0.003	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:
Human Health Standard Groundwater

Station Name	Reporting Units	Human Health Standard Groundwater	SP-7	SP-7	SP-7	SP-7	SP-7	SP-7	SP-7	SP-7	SP-7	SP-7	SP-7	SP-7	SP-7	SP-8	SP-9	SP-10	SP-10	SP-10
Sample Date			4/18/18 11:35	5/23/18 15:15	5/23/18 15:30	6/12/18 18:15	7/25/18 11:35	8/28/18 17:50	9/19/18 12:50	9/19/18 13:15	10/24/18 11:50	10/24/18 12:10	11/16/18 12:00	11/16/18 12:15	12/14/18 14:00	9/19/18 08:45	9/19/18 09:20	1/17/18 15:15	2/16/18 14:35	3/19/18 17:30
Sample ID			BBC-1804-116	BBC-1805-110	BBC-1805-111	BBC-1806-124	BBC-1807-121	BBC-1808-115	BBC-1809-136	BBC-1809-137	BBC-1810-120	BBC-1810-121	BBC-1811-127	BBC-1811-128	BBC-1812-119	BBC-1809-126	BBC-1809-127	BBC-1801-118	BBC-1802-114	BBC-1803-111
Lab Name			Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO
Remarks			--	--	Duplicate	--	--	--	--	Duplicate	--	Duplicate	--	Duplicate	--	No Sample	No Sample	No Sample	No Sample	No Sample
Lab Sample ID			H18040355-002	H18050624-009	H18050624-010	H18060370-008	H18070565-012	H18080620-006	H18090469-008	H18090469-009	H18100608-009	H18100608-010	H18110402-025	H18110402-026	H18120295-006	--	--	--	--	--
Field Parameters																				
Dissolved Oxygen	mg/L	--	2.33	3.54	--	2.94	5.28	3.22	2.4	--	3.9	3.9	2.3	2.3	2.51	5.67	5.92	--	--	--
Field pH	s.u.	--	7.15	7.77	--	7.04	7.18	7.5	7.32	--	6.86	6.86	7.21	7.21	7.53	7.26	7.71	--	--	--
Field Specific Conductivity	umhos/cm	--	337	330	--	266	336	196	336	--	325	325	337	337	338	388	377	--	--	--
Flow	Gallons Per Min	--	15.3	25.1	--	19.74	136	25	19.7	--	27.83	27.83	19.75	19.75	15.3	6.7	5.4	NF-DRY	NF-DRY	NF-DRY
Water Temperature	Deg C	--	6.6	6.4	--	6.9	--	6.5	7.4	--	7.3	7.3	7.1	7.1	6.9	8.5	6.7	--	--	--
Physical Parameters																				
Total Dissolved Solids	mg/L	--	196	196	193	186	188	186	188	191	185	186	183	183	179	--	--	--	--	--
Total Suspended Solids	mg/L	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	--	--	--	--	--
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	160	160	160	160	160	160	170	170	170	170	170	170	170	--	--	--	--	--
Calcium (DIS)	mg/L	--	42	42	42	44	42	43	44	44	43	43	44	44	46	--	--	--	--	--
Chloride	mg/L	--	2	2	2	2	2	2	2	2	2	2	2	2	2	--	--	--	--	--
Fluoride	mg/L	4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	--	--	--	--	--
Hardness as CaCO3	mg/L	--	163	164	163	171	166	167	171	170	170	168	170	176	176	--	--	--	--	--
Magnesium (DIS)	mg/L	--	14	14	14	15	15	15	15	15	15	15	15	16	15	--	--	--	--	--
Potassium (DIS)	mg/L	--	3	3	3	3	2	2	3	3	3	3	3	3	3	--	--	--	--	--
Sodium (DIS)	mg/L	--	5	5	5	5	4	4	5	5	5	4	5	5	5	--	--	--	--	--
Sulfate	mg/L	--	10	10	10	9	10	11	10	10	12	11	11	11	10	--	--	--	--	--
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	0.33	0.32	0.32	0.3	0.3	0.34	0.34	0.34	0.3	0.3	0.32	0.33	0.34	--	--	--	--	--
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	0.017	<0.009	<0.009	<0.009	--	--	--	--	--
Antimony (DIS)	mg/L	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	--	--	--	--
Arsenic (DIS)	mg/L	0.01	0.003	0.004	0.004	0.004	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.004	--	--	--	--	--
Barium (DIS)	mg/L	1	0.11	0.11	0.106	0.114	0.111	0.111	0.113	0.111	0.116	0.114	0.116	0.128	0.116	--	--	--	--	--
Beryllium (DIS)	mg/L	0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	--	--	--	--
Cadmium (DIS)	mg/L	0.005	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--	--	--	--	--
Chromium (DIS)	mg/L	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--
Cobalt (DIS)	mg/L	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	--
Copper (DIS)	mg/L	1.3	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--
Iron (DIS)	mg/L	--	<0.02	0.18 J	<0.02	<0.02	<0.02	<0.02	0.04	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	--	--	--	--	--
Lead (DIS)	mg/L	0.015	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	--	--	--
Manganese (DIS)	mg/L	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--
Mercury (DIS)	mg/L	0.002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	--	--	--	--
Molybdenum (DIS)	mg/L	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--
Nickel (DIS)	mg/L	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--
Selenium (DIS)	mg/L	0.05	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	--	--	--	--	--
Silver (DIS)	mg/L	0.1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	--
Strontium (DIS)	mg/L	4	0.167	0.166	0.164	0.17	0.162	0.164	0.166	0.167	0.172	0.171	0.172	0.188	0.169	--	--	--	--	--
Thallium (DIS)	mg/L	0.002	0.0009	0.001	0.0009	0.0011	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0011	0.001	--	--	--	--	--
Uranium (DIS)	mg/L	0.03	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0009	0.001	0.0009	--	--	--	--	--
Zinc (DIS)	mg/L	2	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	0.003	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Human Health Standard Groundwater
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Station Name	Reporting Units	Human Health Standard Groundwater	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	SP-10	
Sample Date			4/18/18 10:30	5/23/18 10:15	6/12/18 17:15	6/12/18 17:45	7/24/18 15:30	8/28/18 15:35	9/19/18 10:10	10/23/18 16:30	11/15/18 13:30	12/14/18 13:10	4/18/18 12:15	5/23/18 16:00	6/12/18 14:15	7/24/18 14:30	8/28/18 14:20	9/19/18 16:15	10/23/18 15:30	11/12/18 12:30	
Sample ID			BBC-1804-120	BBC-1805-100	BBC-1806-122	BBC-1806-123	BBC-1807-110	BBC-1808-111	BBC-1809-128	BBC-1810-110	BBC-1811-119	BBC-1812-116	BBC-1804-117	BBC-1805-112	BBC-1806-116	BBC-1807-109	BBC-1808-110	BBC-1809-144	BBC-1810-108	BBC-1811-200	
Lab Name			HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks			No Sample	--	--	Duplicate	--	--	--	--	--	--	--	No Sample	--	--	--	--	--	--	--
Lab Sample ID			--	H18050624-001	H18060370-006	H18060370-007	H18070565-002	H18080620-003	H18090469-005	H18100608-003	H18110402-020	H18120295-005	H18040355-003	--	H18060370-001	H18070565-001	H18080620-002	H18090469-010	H18100608-001	H18110266-001	
Field Parameters																					
Dissolved Oxygen	mg/L	--	--	8.4	8.93	--	8.06	6.76	7.81	8	7.59	8.12	8.15	--	6.8	7.4	6.65	7.21	7.63	6.98	
Field pH	s.u.	--	--	6.92	7.47	--	7.53	7.71	7.25	7.59	7.55	8.09	6.77	--	7.45	7.85	7.96	6.28	7.09	7.71	
Field Specific Conductivity	umhos/cm	--	--	361	395	--	305	419	428	422	428	434	173	--	171	189	186	184	193	195	
Flow	Gallons Per Min	--	NF-DRY	59.69	22.44	--	11.22	1.93	1.9	0.94	0.58	NM	NM	NM	NM	NM	NM	NM	NM	NM	
Water Temperature	Deg C	--	--	6.1	6.9	--	8.1	7.4	8.1	8.1	6.2	4.6	6.3	--	6.5	6.8	6.1	7.4	6.7	6.13	
Physical Parameters																					
Total Dissolved Solids	mg/L	--	--	203	209	210	225	234	233	234	232	229	133	--	130	116	115	128	115	116	
Total Suspended Solids	mg/L	--	--	<10	<10	<10	<10	68 J	<10	51	<10	27 J	<10	--	<10	<10	<10	<10	<10	<10	
Major Constituents - Commons Ions																					
Alkalinity as CaCO3	mg/L	--	--	180	200	200	210	220	220	220	220	220	82	--	88	92	92	92	93	95	
Calcium (DIS)	mg/L	--	--	49	55	54	54	56	58	60	60	61	21	--	24	23	22	24	23	23	
Chloride	mg/L	--	--	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	--	<1	<1	<1	<1	<1	<1	
Fluoride	mg/L	4	--	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	--	0.2	0.2	0.2	0.2	0.1	0.1	
Hardness as CaCO3	mg/L	--	--	193	217	213	218	220	231	236	241	245	81	--	93	92	88	95	94	91	
Magnesium (DIS)	mg/L	--	--	17	19	19	20	20	21	21	22	22	7	--	8	8	8	8	9	8	
Potassium (DIS)	mg/L	--	--	<1	<1	<1	<1	1	1	1	1	1	1	--	1	1	1	2	1	1	
Sodium (DIS)	mg/L	--	--	2	2	2	2	2	2	2	2	2	3	--	3	3	4	4	4	4	
Sulfate	mg/L	--	--	8	10	10	13	14	14	17	17	16	6	--	5	6	7	7	8	8	
Nutrients																					
Nitrate + Nitrite as N	mg/L	10	--	0.16	0.19	0.2	0.19	0.24	0.24	0.24	0.27	0.28	0.31	--	0.26	0.25	0.27	0.26	0.23	0.24	
Metals - Trace Constituents																					
Aluminum (DIS)	mg/L	--	--	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	0.479	--	0.096	0.185	0.019	0.017	0.018	0.022	
Antimony (DIS)	mg/L	0.006	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Arsenic (DIS)	mg/L	0.01	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.008	--	0.008	0.006	0.006	0.005	0.005	0.005	
Barium (DIS)	mg/L	1	--	0.04	0.048	0.048	0.05	0.055	0.053	0.056	0.053	0.053	0.265	--	0.313	0.284	0.288	0.281	0.29	0.287	
Beryllium (DIS)	mg/L	0.004	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	
Cadmium (DIS)	mg/L	0.005	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	
Chromium (DIS)	mg/L	0.1	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cobalt (DIS)	mg/L	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Copper (DIS)	mg/L	1.3	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Iron (DIS)	mg/L	--	--	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.17	--	0.06	0.08	<0.02	0.05	<0.02	<0.02	
Lead (DIS)	mg/L	0.015	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	
Manganese (DIS)	mg/L	--	--	<0.005	<0.005	<0.005	<0.005	0.024	0.009	<0.005	<0.005	0.012	<0.005	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Mercury (DIS)	mg/L	0.002	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	
Molybdenum (DIS)	mg/L	--	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Nickel (DIS)	mg/L	0.1	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium (DIS)	mg/L	0.05	--	<0.0002	0.0002	<0.0002	<0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Silver (DIS)	mg/L	0.1	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Strontium (DIS)	mg/L	4	--	0.095	0.108	0.108	0.109	0.113	0.115	0.122	0.12	0.113	0.0856	--	0.104	0.0978	0.0996	0.101	0.104	0.103	
Thallium (DIS)	mg/L	0.002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Uranium (DIS)	mg/L	0.03	--	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0008	0.0008	<0.008	--	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	
Zinc (DIS)	mg/L	2	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	0.002	<0.002	<0.002	0.004	<0.002	<0.002	

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Human Health Standard Groundwater
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Station Name	Reporting Units	Human Health Standard Groundwater	SP-11	SP-12	SP-12	SP-12	SP-12	SP-12	SP-12	SP-12	SP-12	SP-12	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7
Sample Date			12/14/18 10:35	4/18/18 11:00	5/23/18 15:00	6/12/18 14:45	7/24/18 17:25	8/28/18 13:55	9/19/18 16:30	10/23/18 16:00	11/16/18 11:05	12/14/18 14:30	1/17/18 14:30	2/16/18 14:25	3/19/18 16:30	4/18/18 09:45	5/23/18 11:50	6/12/18 15:40	7/24/18 17:00	9/19/18 11:05
Sample ID			BBC-1812-108	BBC-1804-115	BBC-1805-109	BBC-1806-117	BBC-1807-114	BBC-1808-109	BBC-1809-145	BBC-1810-109	BBC-1811-126	BBC-1812-120	BBC-1801-116	BBC-1802-112	BBC-1803-109	BBC-1804-118	BBC-1805-103	BBC-1806-119	BBC-1807-113	BBC-1809-130
Lab Name			Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks			--	--	No Sample	--	--	--	--	--	--	--	No Sample	No Sample	No Sample	No Sample	--	--	--	--
Lab Sample ID			H18120295-001	H18040355-001	--	H18060370-002	H18070565-005	H18080620-001	H18090469-011	H18100608-002	H18110402-024	H18120295-007	--	--	--	--	H18050624-003	H18060370-004	H18070565-004	H18090469-007
Field Parameters																				
Dissolved Oxygen	mg/L	--	7.03	8.8	--	8.43	7.04	4.6	5.53	4.57	3.32	8.03	--	--	--	--	9.02	8.32	7.31	7.4
Field pH	s.u.	--	7.75	7.27	--	7.71	7.77	7.95	6.76	7.31	7.53	7.7	--	--	--	--	7.72	7.66	7.59	7.78
Field Specific Conductivity	umhos/cm	--	194	452	--	473	426	437	428	436	453	459	--	--	--	--	405	413	414	421
Flow	Gallons Per Min	--	NM	NM-ICE	NM	NM	NM	NM	NF	NM	NM	NM	NF-DRY	NF-DRY	NF-DRY	NF-DRY	54.76	17.06	6.7	0.94
Water Temperature	Deg C	--	5.9	6.2	--	5.1	6.9	6.1	7.3	7.1	6.2	6	--	--	--	--	5.4	10.3	10.7	8.8
Physical Parameters																				
Total Dissolved Solids	mg/L	--	104	262	--	248	235	256	255	249	247	253	--	--	--	--	231	236	232	225
Total Suspended Solids	mg/L	--	<10	23	--	34	<10	<10	<10	47	22 J	<10	--	--	--	--	<10	<10	<10	219
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	94	200	--	190	190	200	210	210	210	220	--	--	--	--	210	220	220	230
Calcium (DIS)	mg/L	--	22	55	--	53	52	54	57	56	56	61	--	--	--	--	57	61	58	60
Chloride	mg/L	--	<1	5	--	9	8	10	8	6	6	8	--	--	--	--	<1	<1	<1	<1
Fluoride	mg/L	4	0.2	0.2	--	0.2	0.2	0.2	0.2	0.2	0.2	0.2	--	--	--	--	0.1	0.1	0.1	0.1
Hardness as CaCO3	mg/L	--	89	233	--	227	224	226	241	239	243	258	--	--	--	--	215	228	222	228
Magnesium (DIS)	mg/L	--	8	24	--	23	23	22	24	24	25	26	--	--	--	--	18	19	19	19
Potassium (DIS)	mg/L	--	1	1	--	1	1	2	2	1	1	1	--	--	--	--	<1	<1	<1	<1
Sodium (DIS)	mg/L	--	4	2	--	2	2	3	3	2	2	2	--	--	--	--	2	2	2	2
Sulfate	mg/L	--	7	28	--	21	21	24	23	27	26	24	--	--	--	--	8	8	9	9
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	0.24	0.29	--	0.57	0.38	0.6	0.69	0.33	0.33	0.41	--	--	--	--	0.06	0.03	0.06	0.04
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	0.02	<0.009	--	<0.009	0.014	<0.009	<0.009	<0.009	<0.009	<0.009	--	--	--	--	<0.009	<0.009	<0.009	<0.009
Antimony (DIS)	mg/L	0.006	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (DIS)	mg/L	0.01	0.005	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	--	--	<0.001	<0.001	<0.001	<0.001
Barium (DIS)	mg/L	1	0.284	0.172	--	0.17	0.168	0.18	0.176	0.185	0.192	0.19	--	--	--	--	0.043	0.05	0.051	0.057
Beryllium (DIS)	mg/L	0.004	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	--	--	--	<0.0008	<0.0008	<0.0008	<0.0008
Cadmium (DIS)	mg/L	0.005	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--	--	--	--	<0.00003	<0.00003	<0.00003	<0.00003
Chromium (DIS)	mg/L	0.1	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01
Cobalt (DIS)	mg/L	--	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.01	<0.01
Copper (DIS)	mg/L	1.3	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	<0.002	<0.002	<0.002	<0.002
Iron (DIS)	mg/L	--	<0.02	<0.02	--	<0.02	0.03	0.06	0.04	<0.02	<0.02	<0.02	--	--	--	--	<0.02	<0.02	<0.02	<0.02
Lead (DIS)	mg/L	0.015	<0.0003	<0.0003	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	--	--	--	<0.0003	<0.0003	<0.0003	<0.0003
Manganese (DIS)	mg/L	--	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	<0.005	<0.005	<0.005	0.017
Mercury (DIS)	mg/L	0.002	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	--	--	--	<0.000005	<0.000005	<0.000005	<0.000005
Molybdenum (DIS)	mg/L	--	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	--	--	--	<0.002	<0.002	<0.002	<0.002
Nickel (DIS)	mg/L	0.1	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	--	--	--	<0.001	<0.001	<0.001	<0.001
Selenium (DIS)	mg/L	0.05	<0.0002	0.0002	--	0.0002	0.0002	<0.0002	0.0002	0.0002	0.0002	0.0002	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002
Silver (DIS)	mg/L	0.1	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002
Strontium (DIS)	mg/L	4	0.101	0.103	--	0.106	0.101	0.107	0.11	0.114	0.114	0.113	--	--	--	--	0.126	0.135	0.131	0.138
Thallium (DIS)	mg/L	0.002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002
Uranium (DIS)	mg/L	0.03	0.0003	<0.008	--	<0.008	<0.008	<0.008	<0.008	<0.008	0.0006	0.0007	--	--	--	--	<0.008	<0.008	<0.008	<0.008
Zinc (DIS)	mg/L	2	<0.002	<0.002	--	<0.002	<0.002	0.003	0.004	0.003	<0.002	<0.002	--	--	--	--	<0.002	0.003	<0.002	<0.002

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

	Human Health Standard Groundwater
--	-----------------------------------

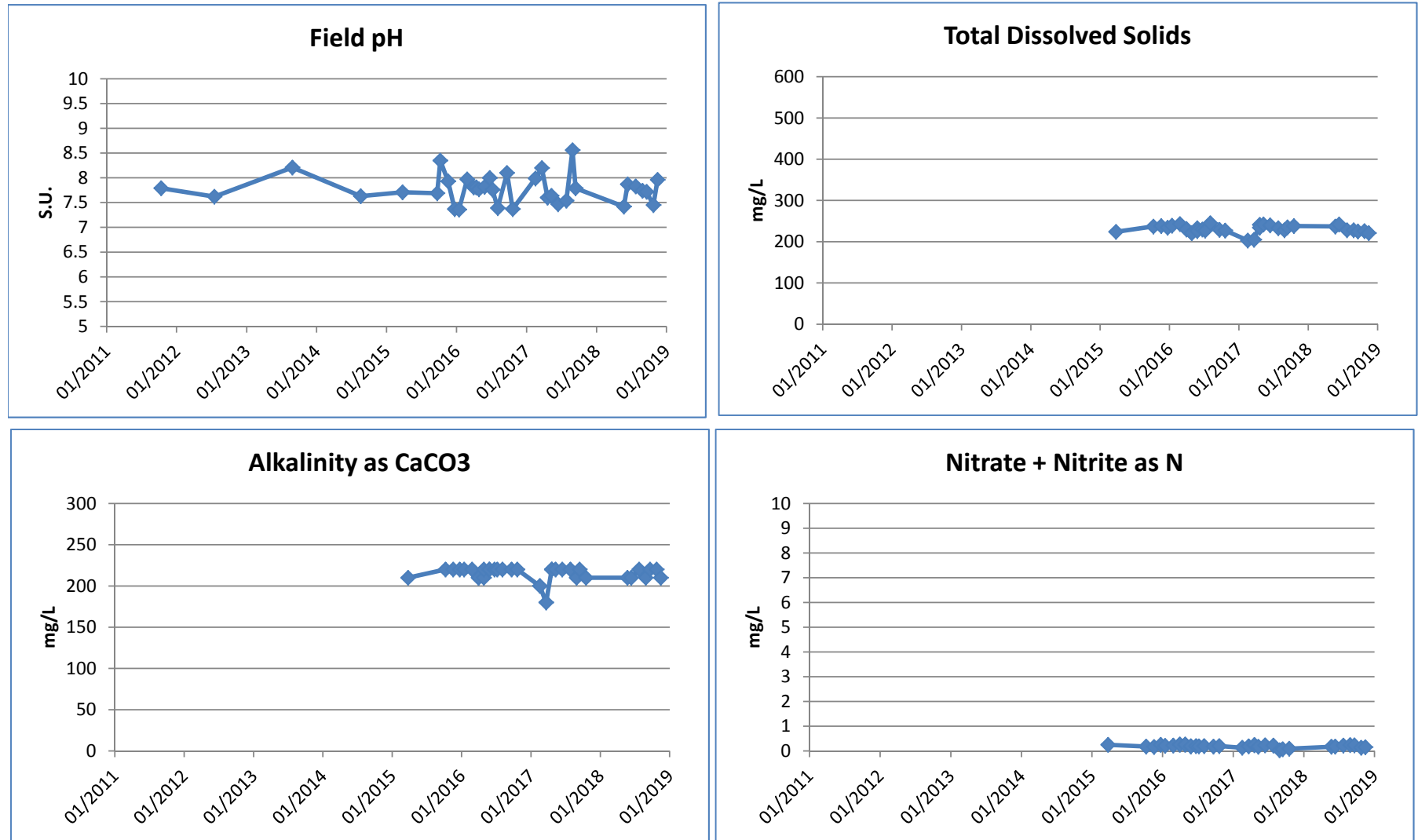
Station Name	Reporting Units	Human Health Standard Groundwater	SW-7	SW-7
Sample Date			11/15/18 11:30	12/14/18 13:35
Sample ID			BBC-1811-117	BBC-1812-118
Lab Name			Energy Labs	HYDRO
Remarks			--	No Sample
Lab Sample ID			H18110402-018	--
Field Parameters				
Dissolved Oxygen	mg/L	--	8.61	--
Field pH	s.u.	--	7.77	--
Field Specific Conductivity	umhos/cm	--	404	--
Flow	Gallons Per Min	--	NM	NF-DRY
Water Temperature	Deg C	--	3.4	--
Physical Parameters				
Total Dissolved Solids	mg/L	--	222	--
Total Suspended Solids	mg/L	--	<10	--
Major Constituents - Commons Ions				
Alkalinity as CaCO3	mg/L	--	210	--
Calcium (DIS)	mg/L	--	58	--
Chloride	mg/L	--	<1	--
Fluoride	mg/L	4	<0.1	--
Hardness as CaCO3	mg/L	--	222	--
Magnesium (DIS)	mg/L	--	19	--
Potassium (DIS)	mg/L	--	<1	--
Sodium (DIS)	mg/L	--	2	--
Sulfate	mg/L	--	10	--
Nutrients				
Nitrate + Nitrite as N	mg/L	10	0.04	--
Metals - Trace Constituents				
Aluminum (DIS)	mg/L	--	<0.009	--
Antimony (DIS)	mg/L	0.006	<0.0005	--
Arsenic (DIS)	mg/L	0.01	<0.001	--
Barium (DIS)	mg/L	1	0.058	--
Beryllium (DIS)	mg/L	0.004	<0.0008	--
Cadmium (DIS)	mg/L	0.005	<0.00003	--
Chromium (DIS)	mg/L	0.1	<0.01	--
Cobalt (DIS)	mg/L	--	<0.01	--
Copper (DIS)	mg/L	1.3	<0.002	--
Iron (DIS)	mg/L	--	<0.02	--
Lead (DIS)	mg/L	0.015	<0.0003	--
Manganese (DIS)	mg/L	--	0.007	--
Mercury (DIS)	mg/L	0.002	<0.000005	--
Molybdenum (DIS)	mg/L	--	<0.002	--
Nickel (DIS)	mg/L	0.1	<0.001	--
Selenium (DIS)	mg/L	0.05	<0.0002	--
Silver (DIS)	mg/L	0.1	<0.0002	--
Strontium (DIS)	mg/L	4	0.137	--
Thallium (DIS)	mg/L	0.002	<0.0002	--
Uranium (DIS)	mg/L	0.03	0.0007	--
Zinc (DIS)	mg/L	2	<0.002	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

Human Health Standard Groundwater

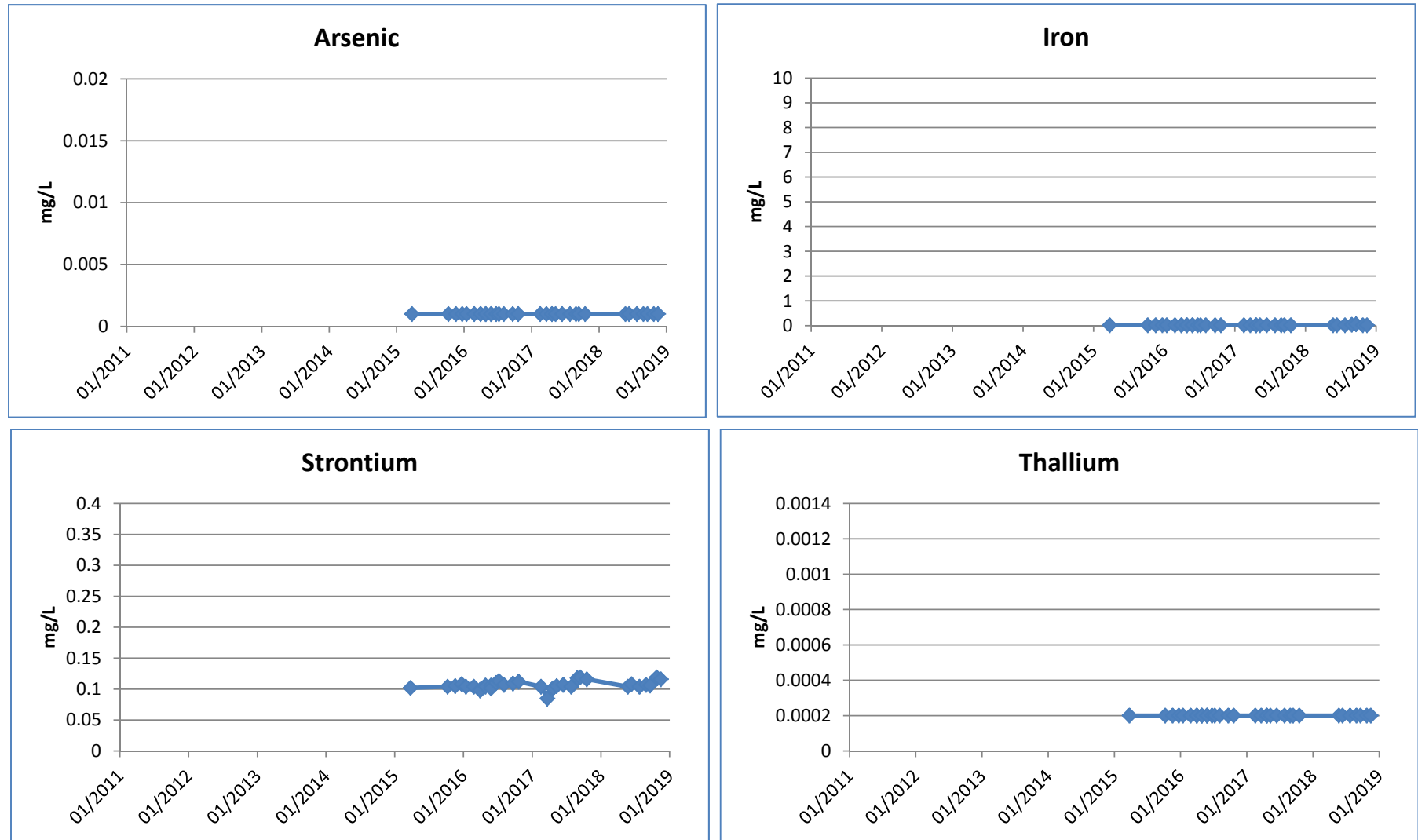
DS-1



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Consulting Scientists and Engineers

**DS-1 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

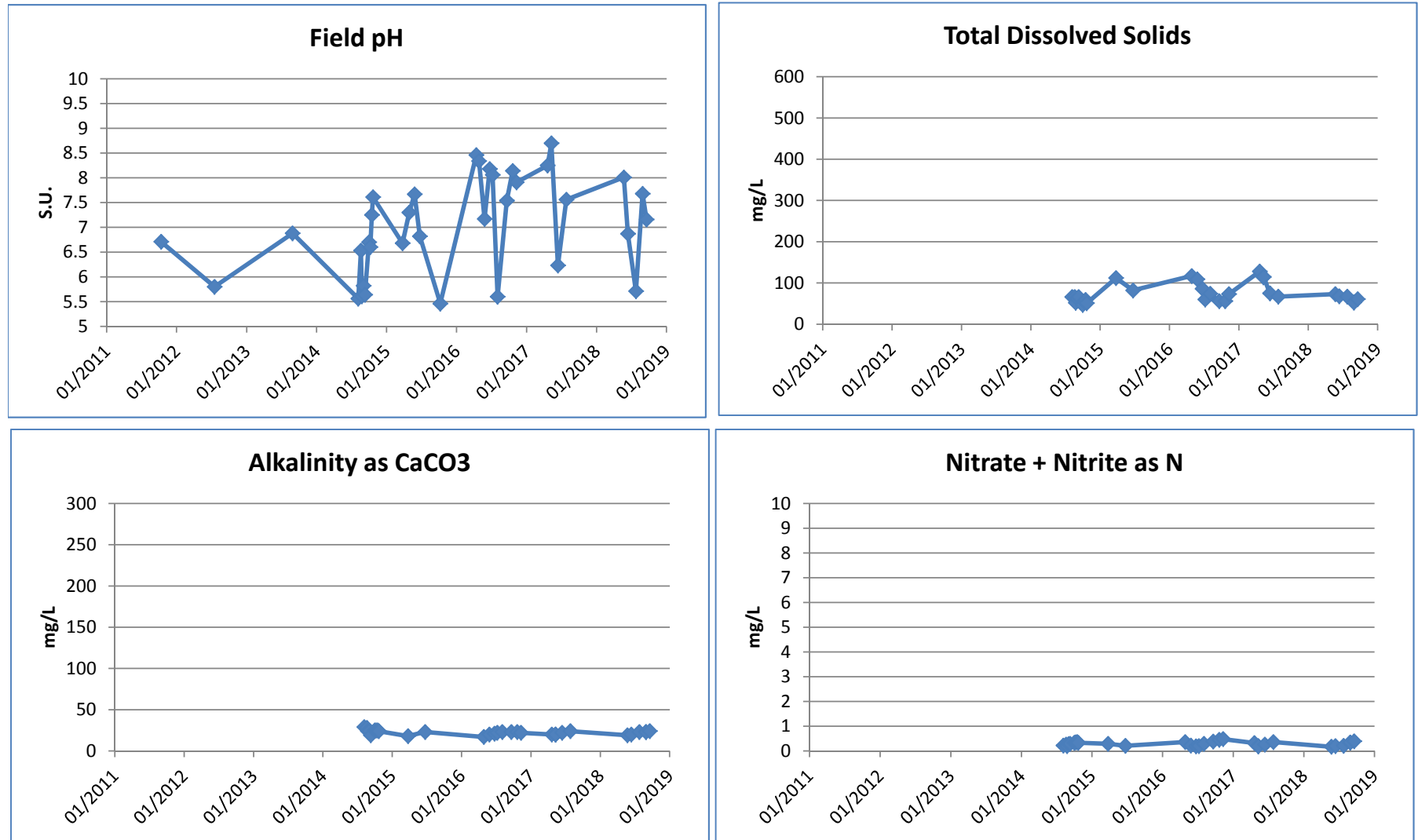
DS-1



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**DS-1 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

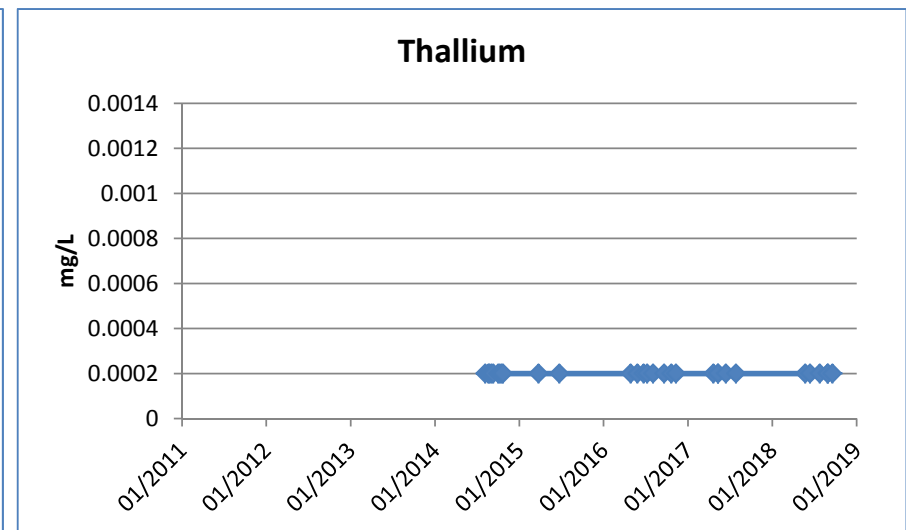
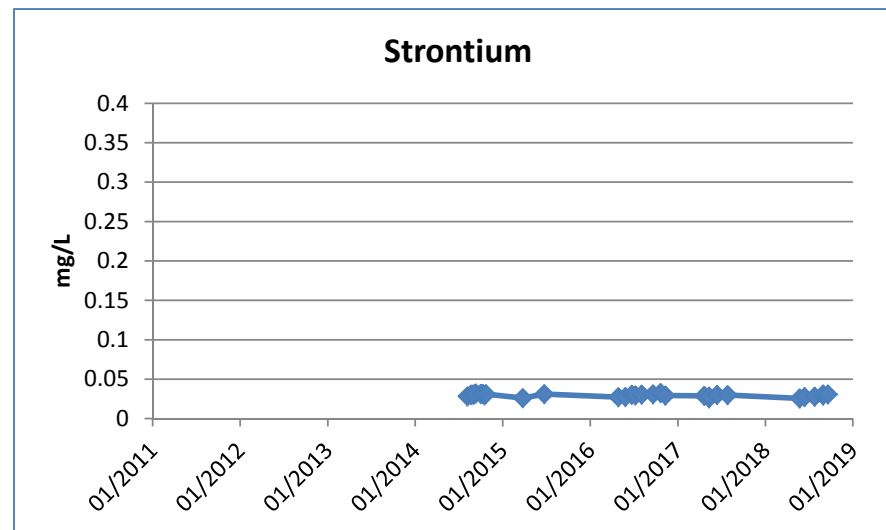
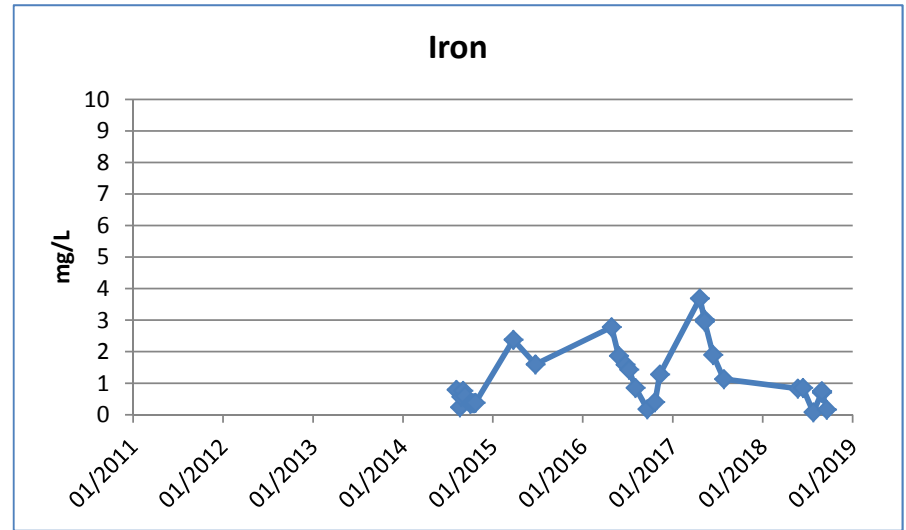
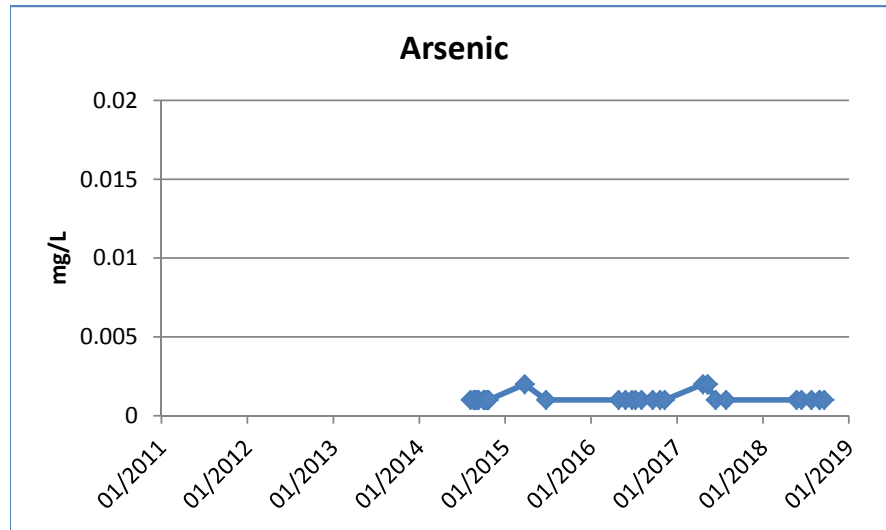
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**DS-3 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

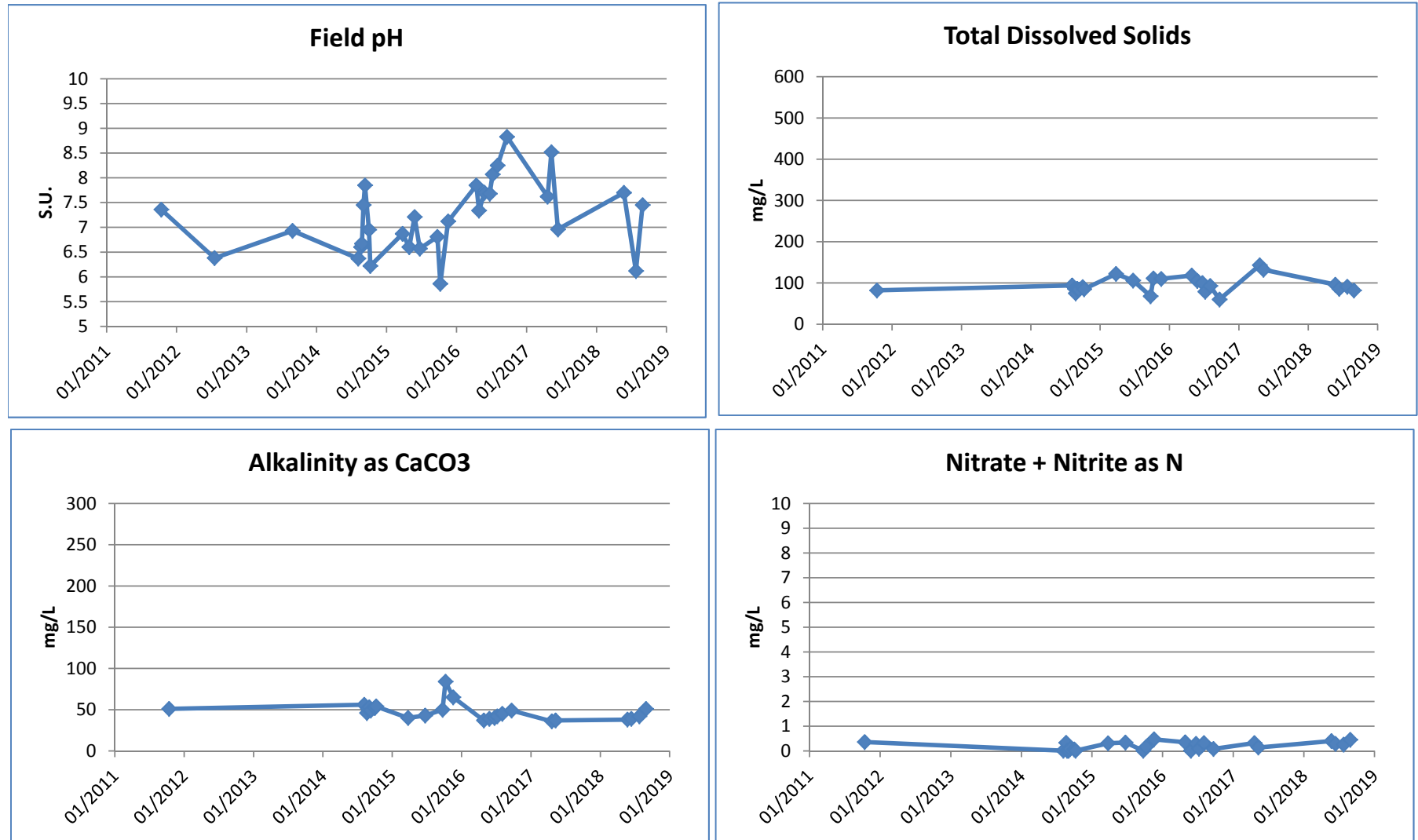
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**DS-3 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

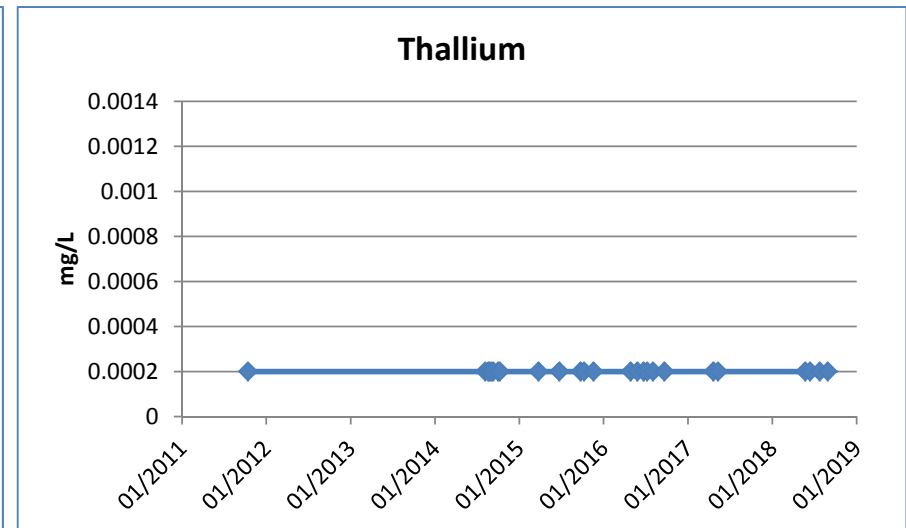
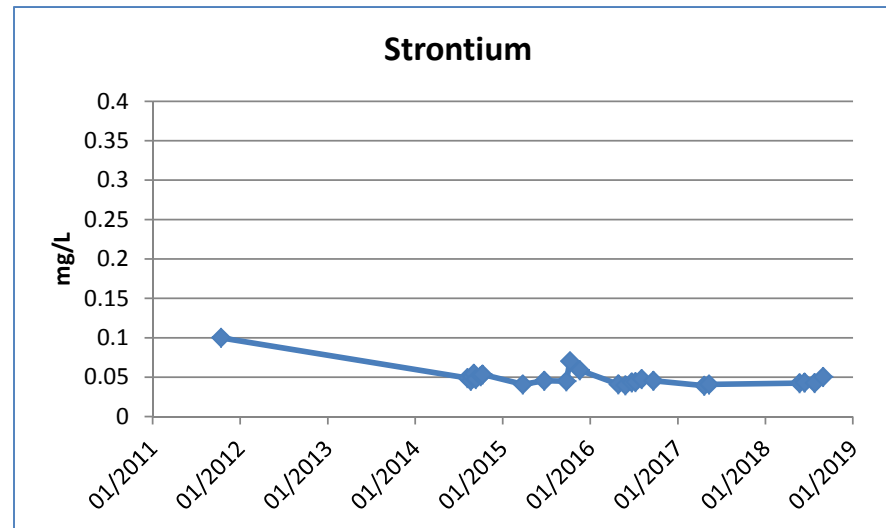
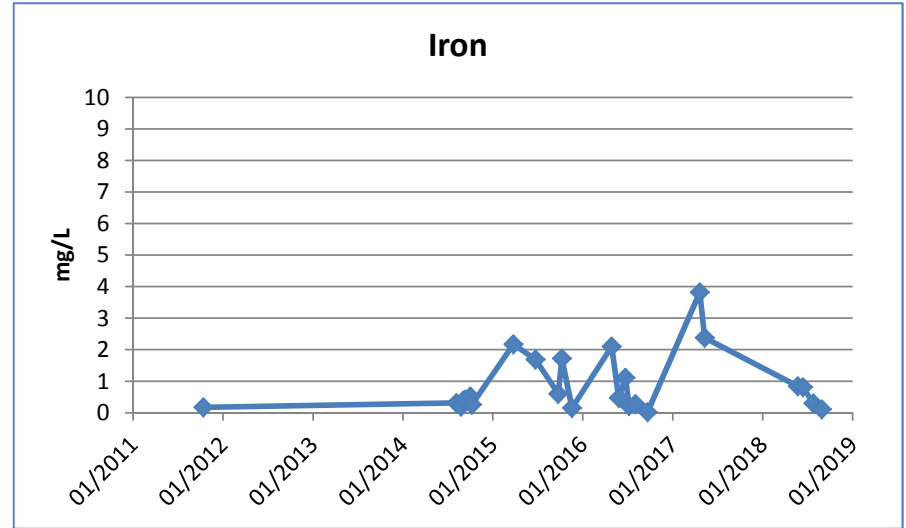
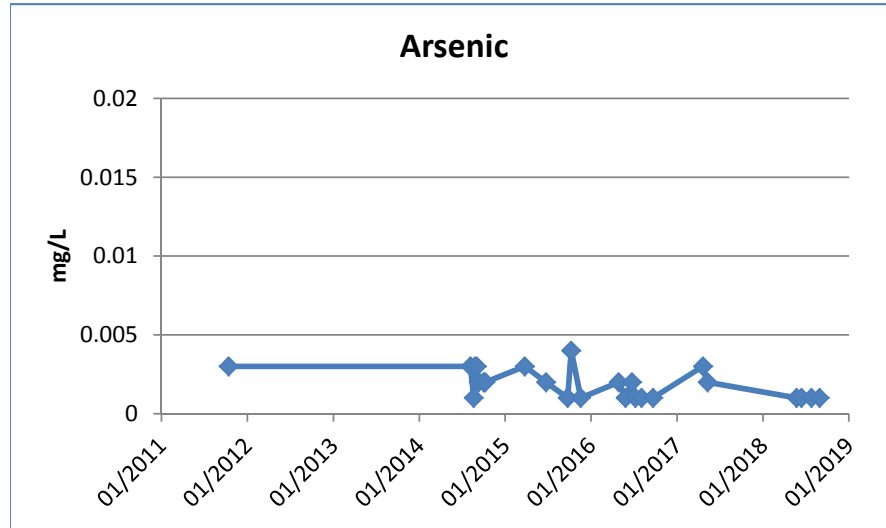
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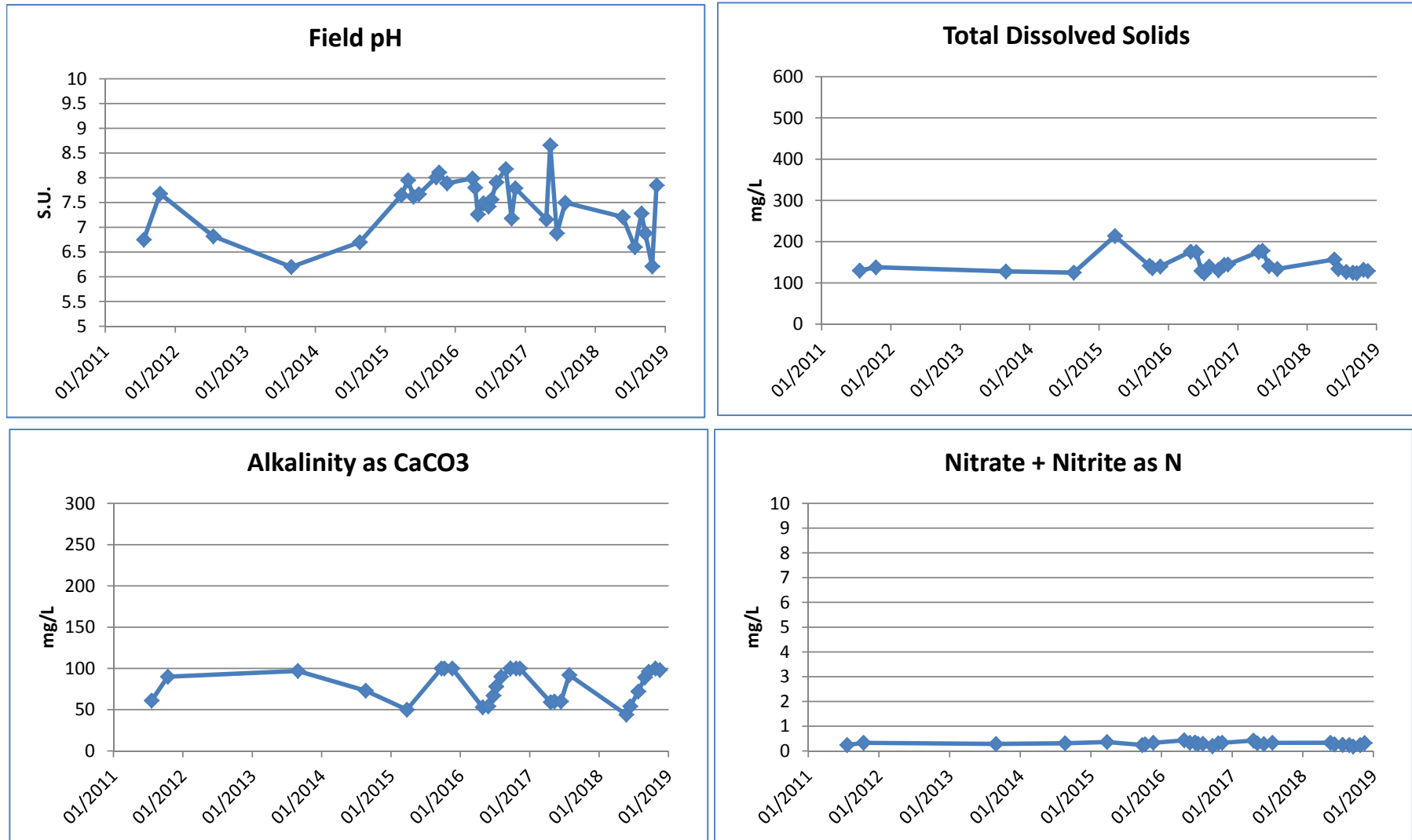
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**DS-4 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

DS-4



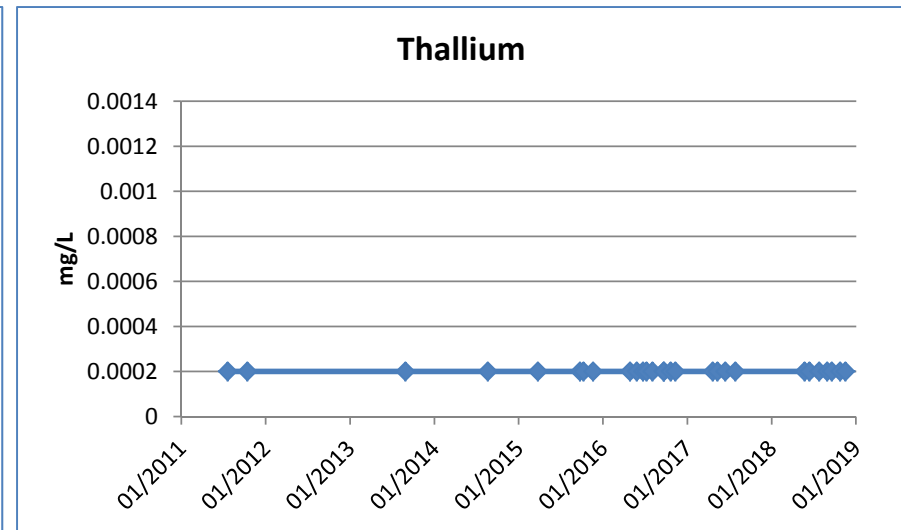
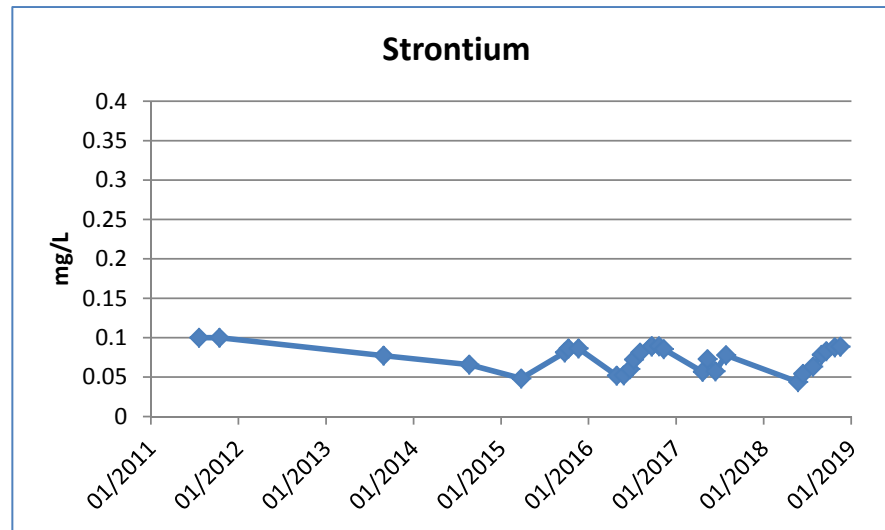
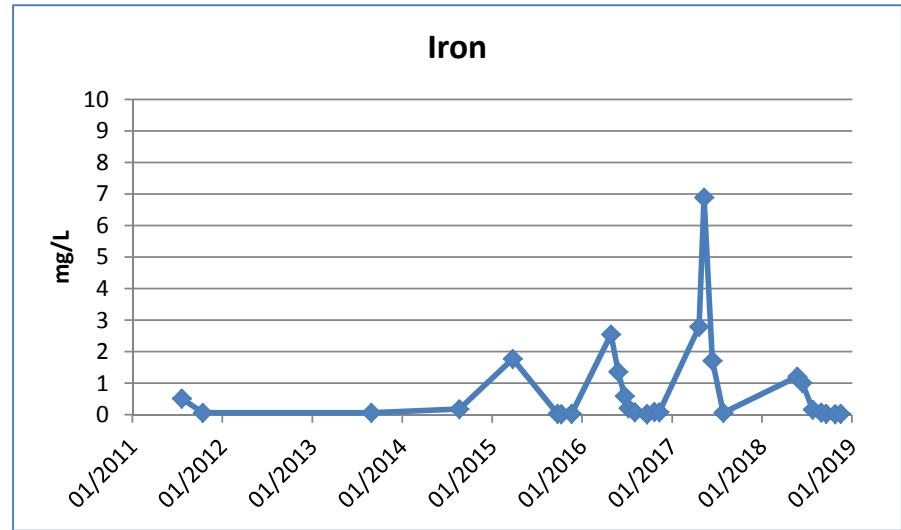
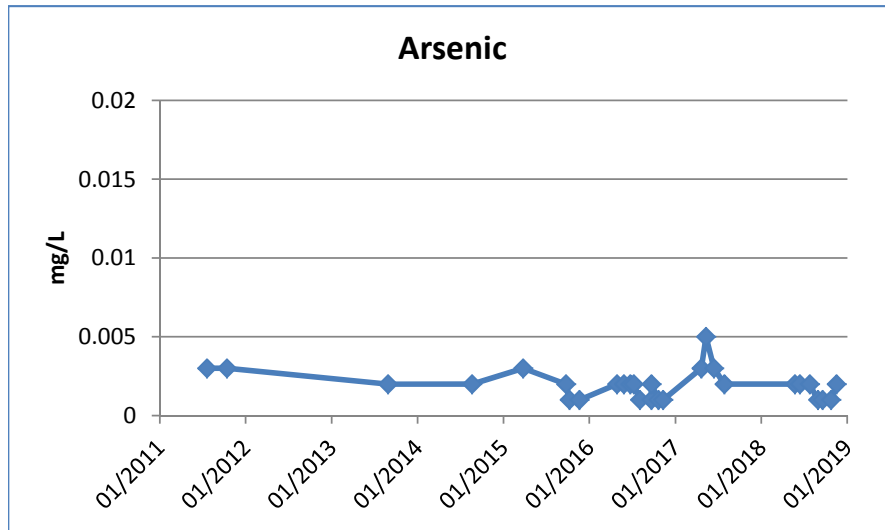
SP-3



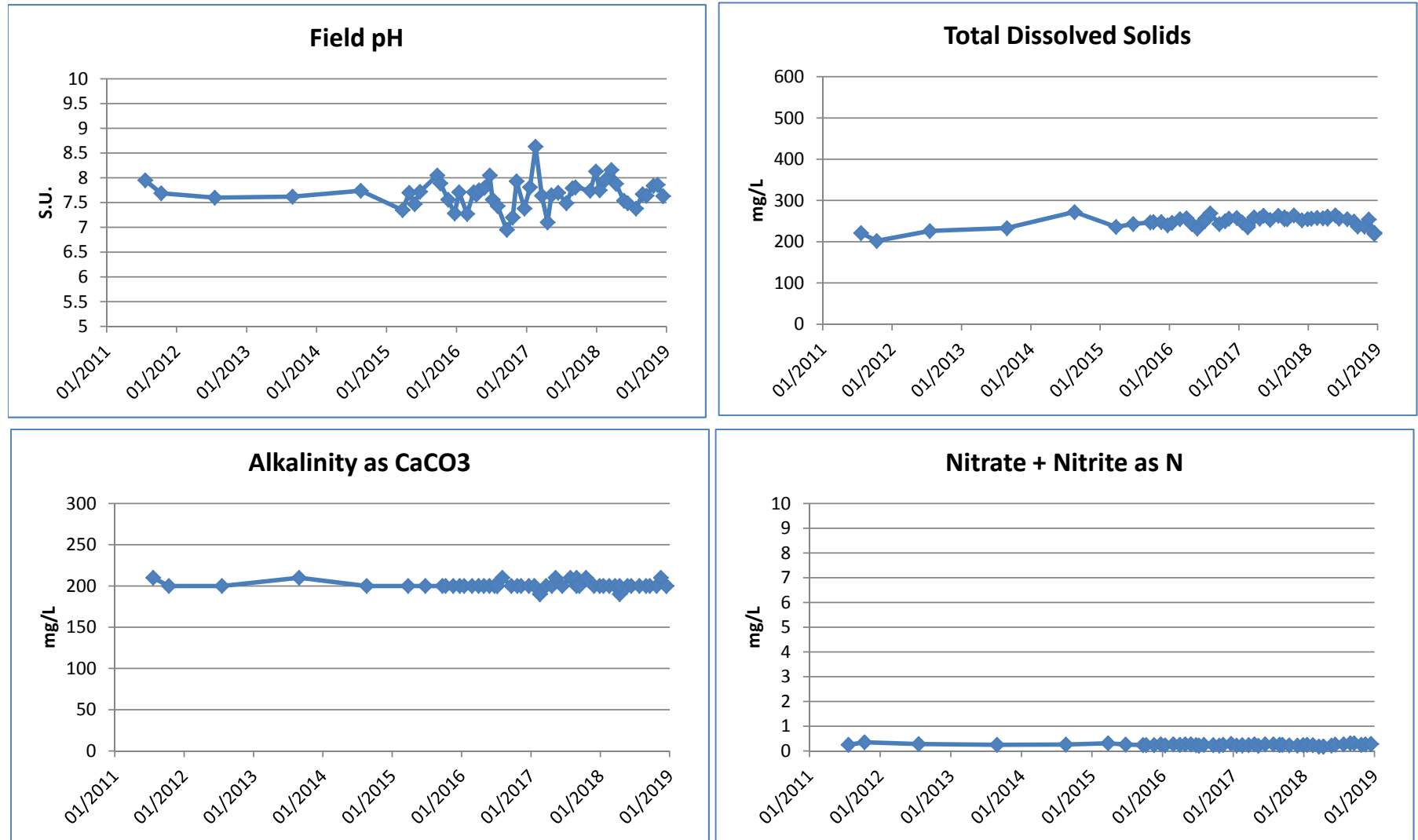
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SP-3 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana

SP-3



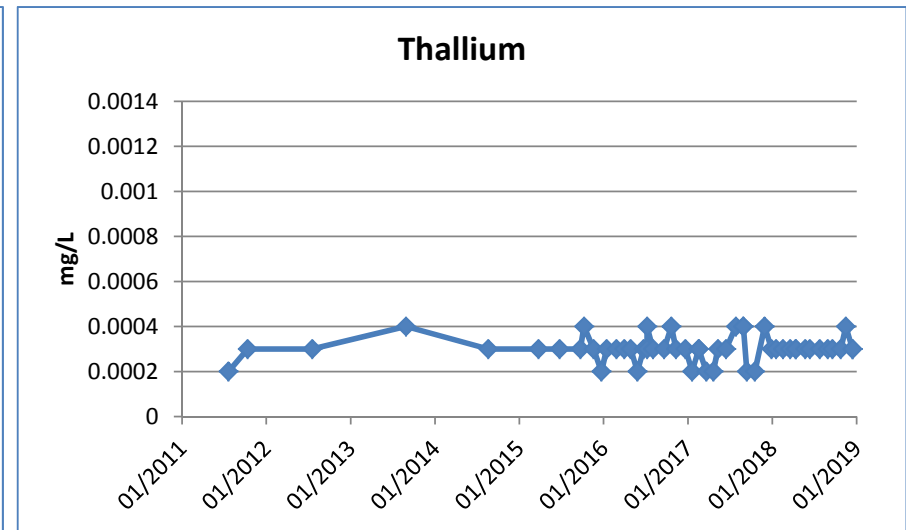
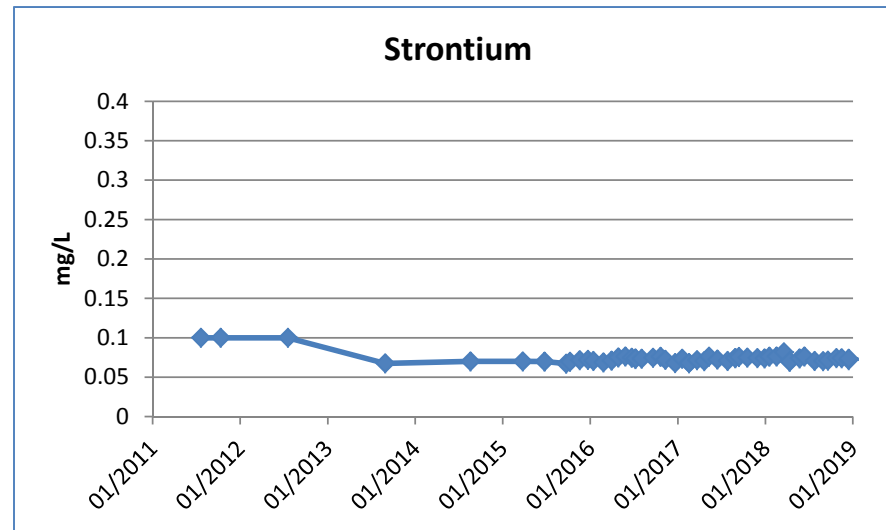
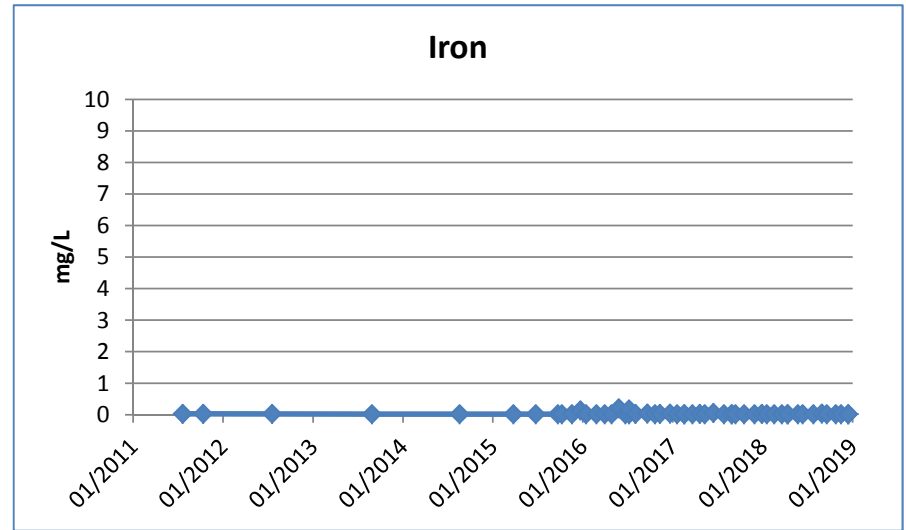
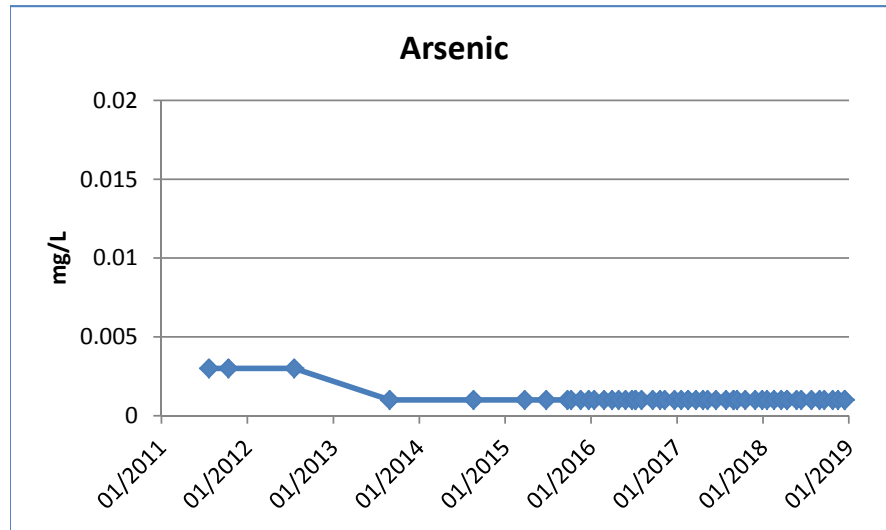
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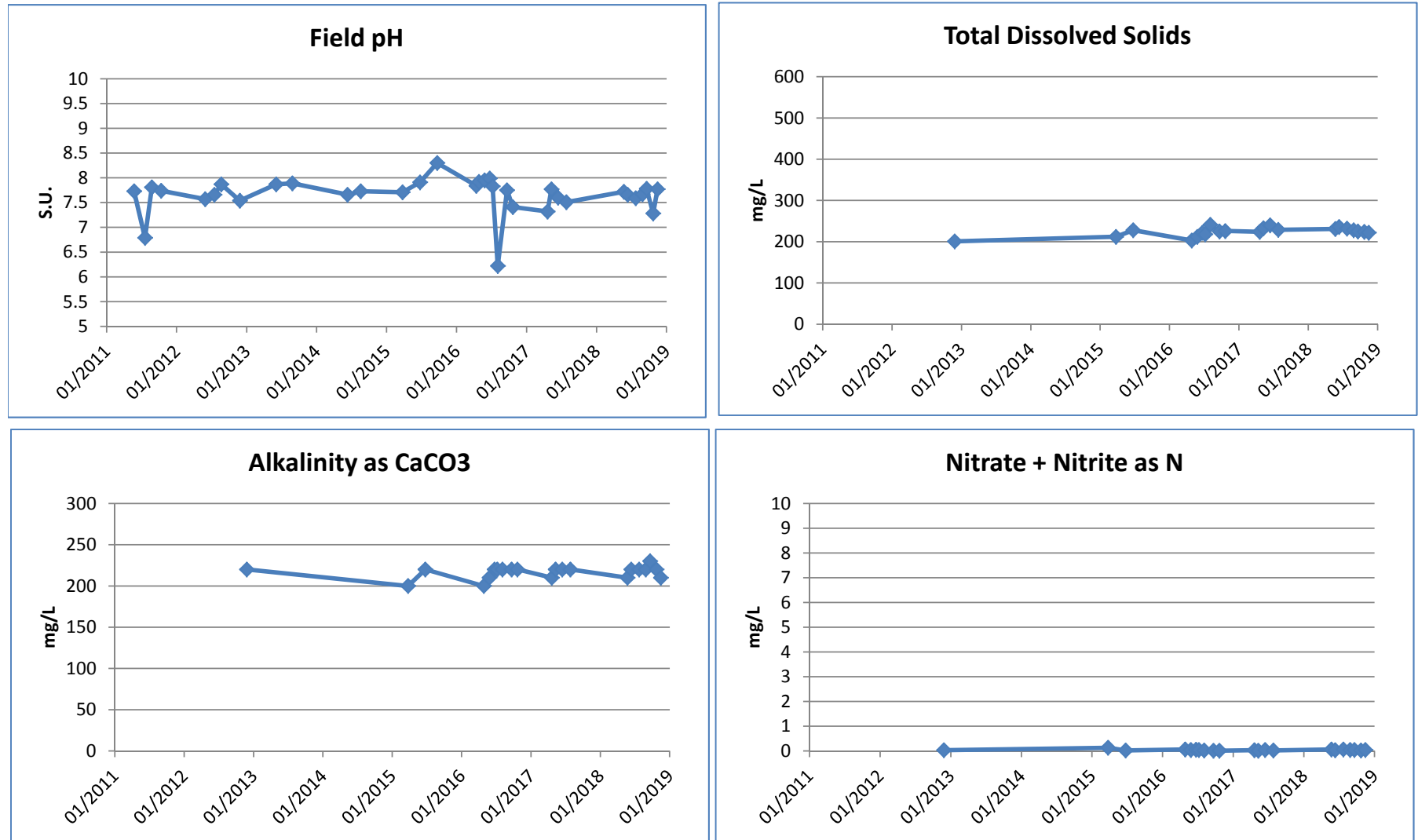
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**SP-4 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

SP-4



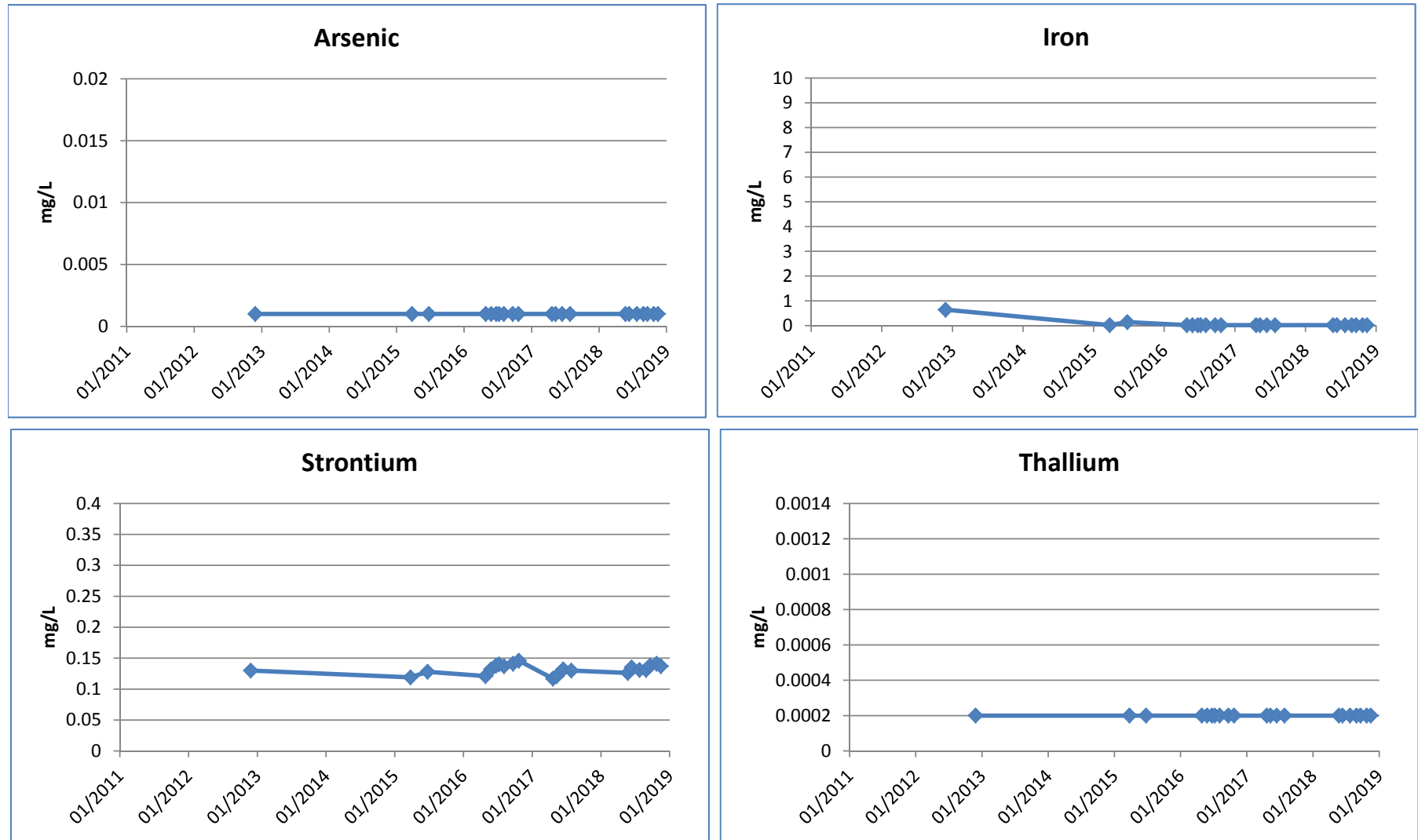
SP-5(SW-7)



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SP-5(SW-7) Data Trend Graph
Black Butte Copper Project
Meagher County, Montana

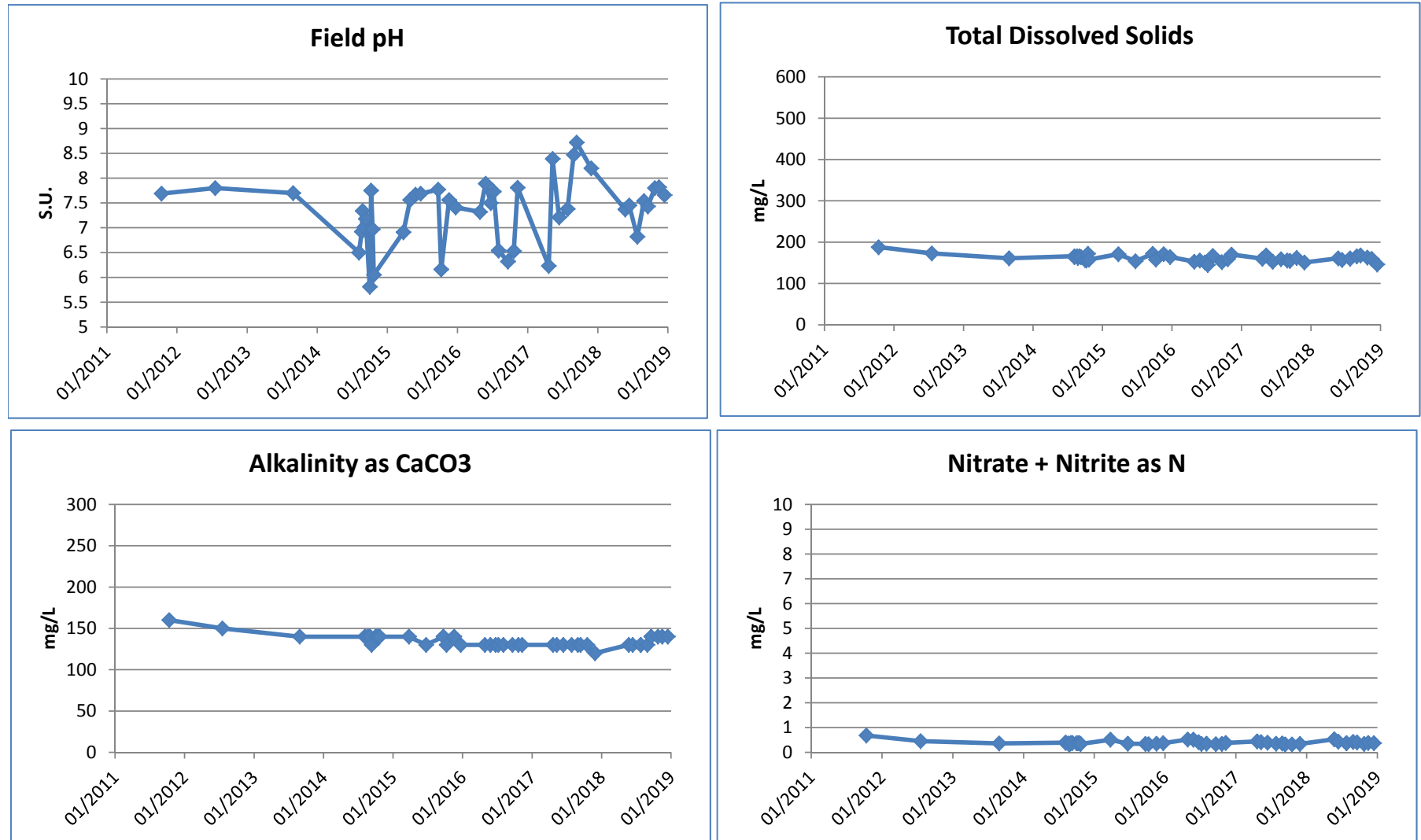
SP-5(SW-7)



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SP-5(SW-7) Data Trend Graph
Black Butte Copper Project
Meagher County, Montana

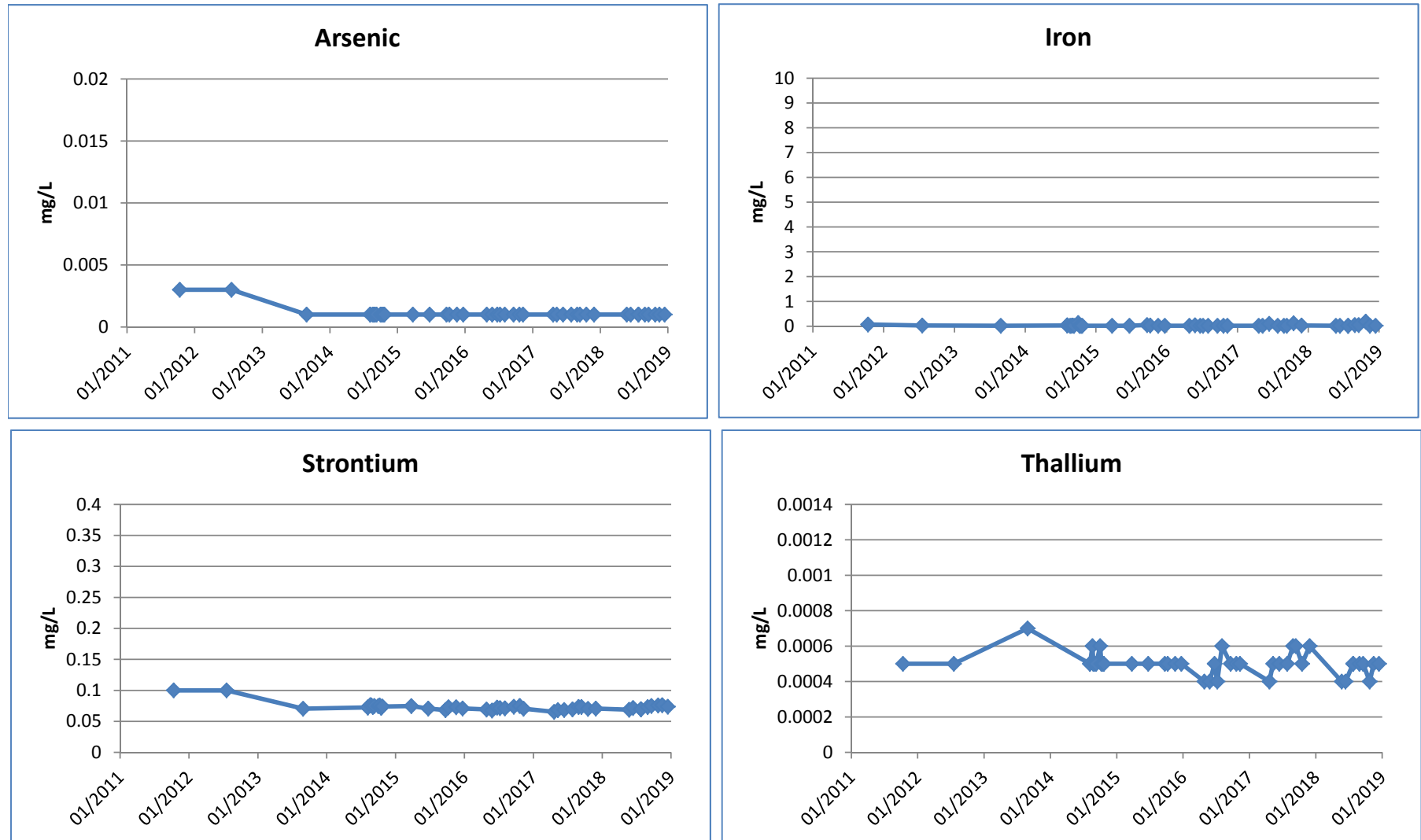
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**SP-6 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

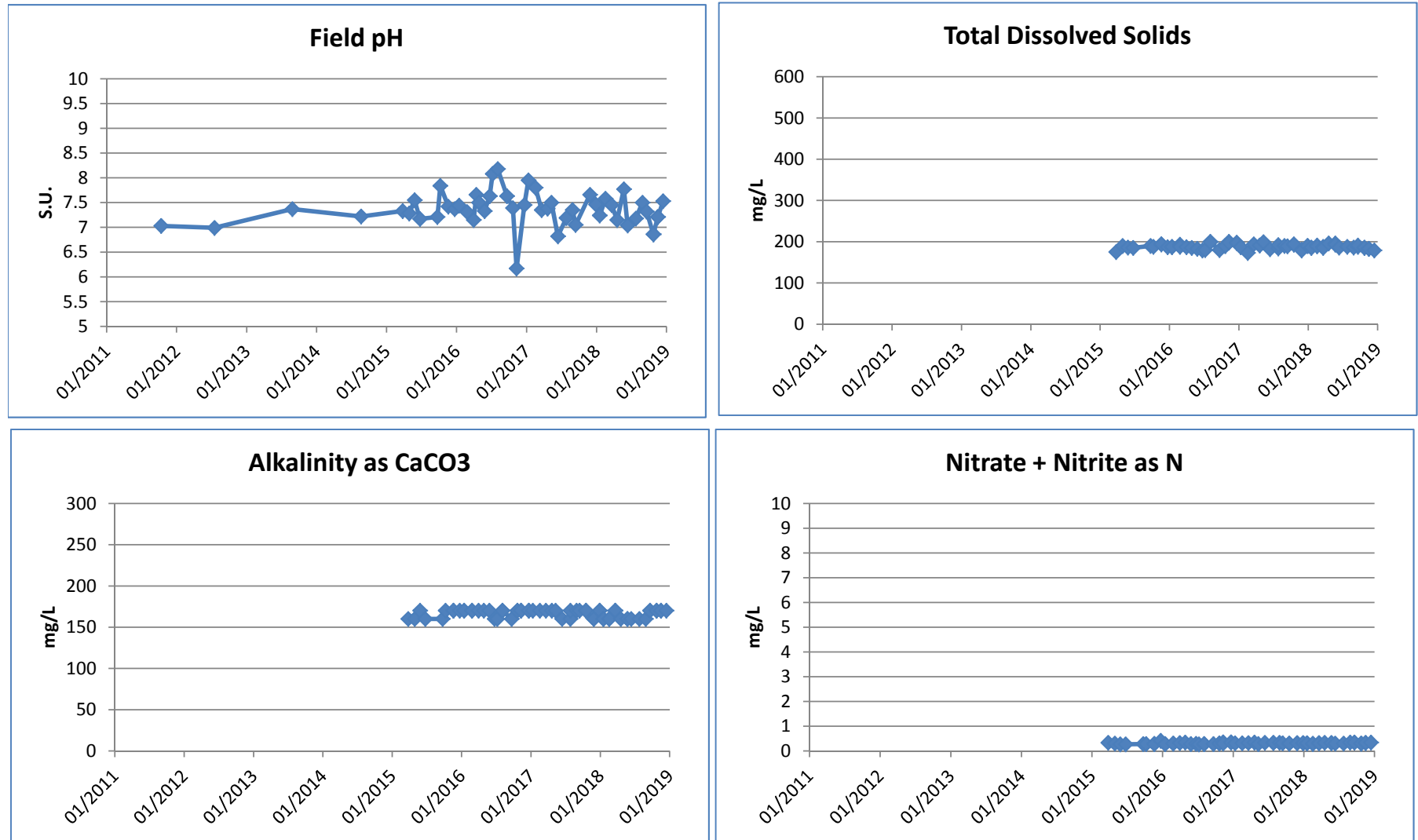
SP-6



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**SP-6 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

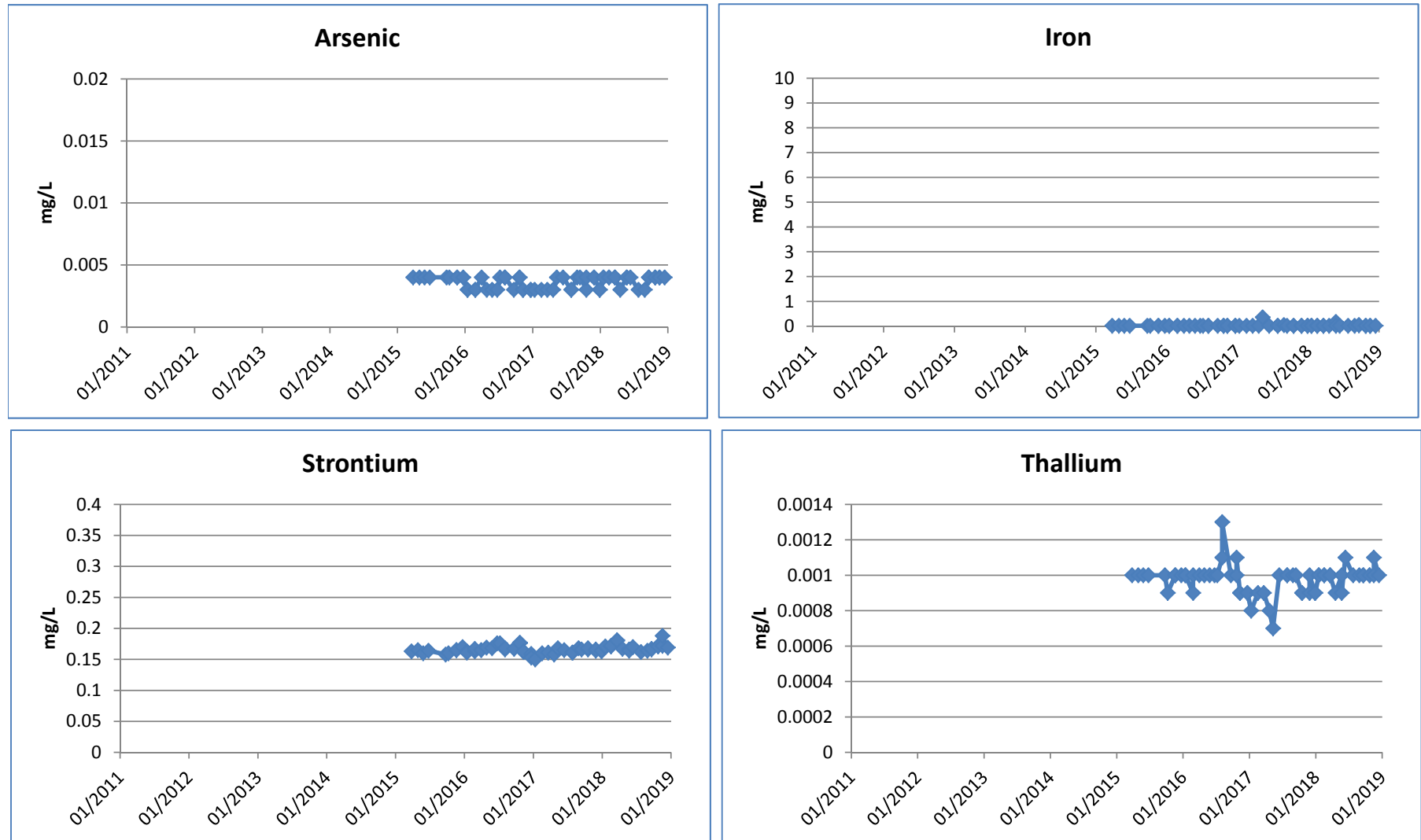
SP-7



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**SP-7 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

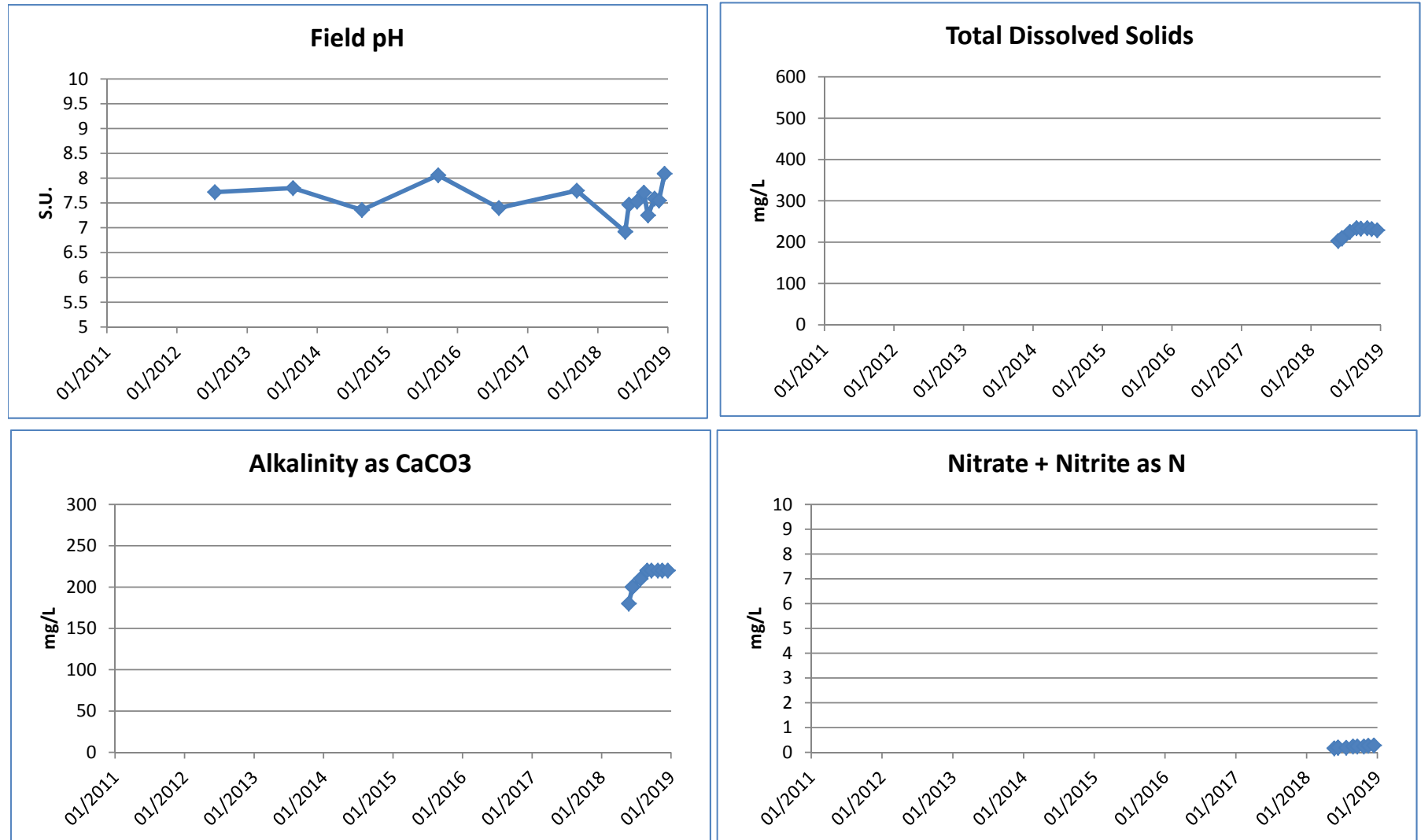
SP-7



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**SP-7 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

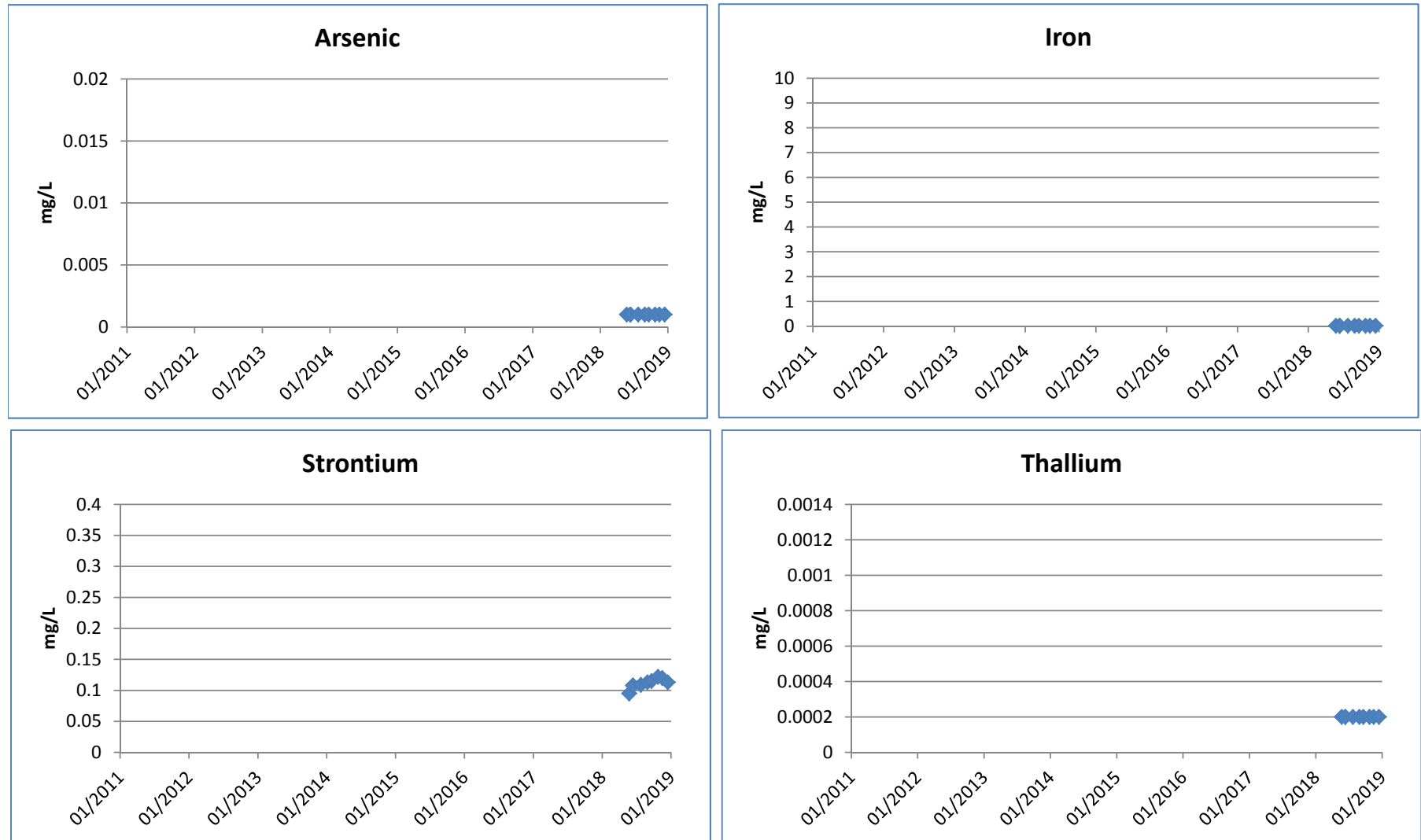
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**SP-10 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

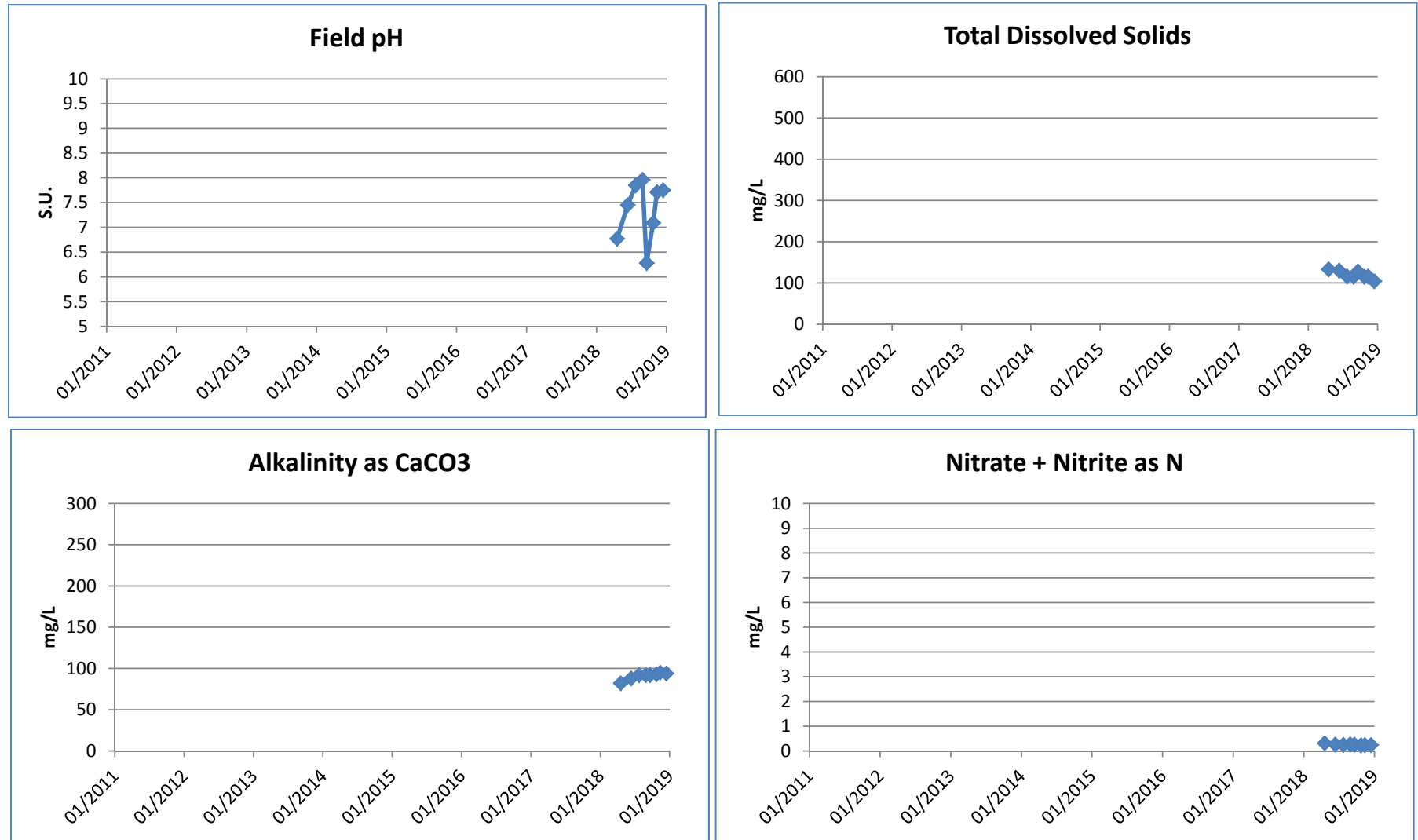
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**SP-10 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

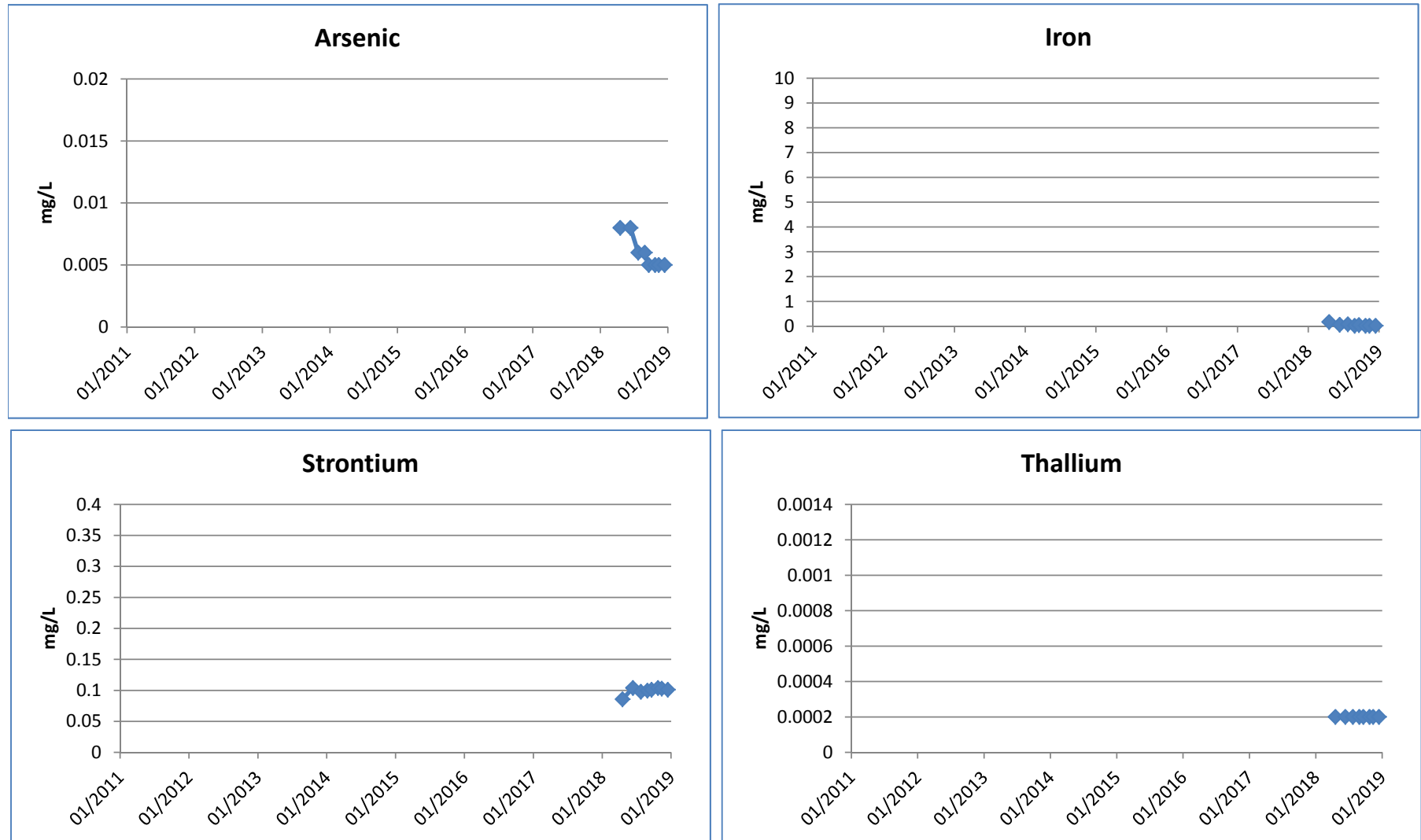
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**SP-11 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

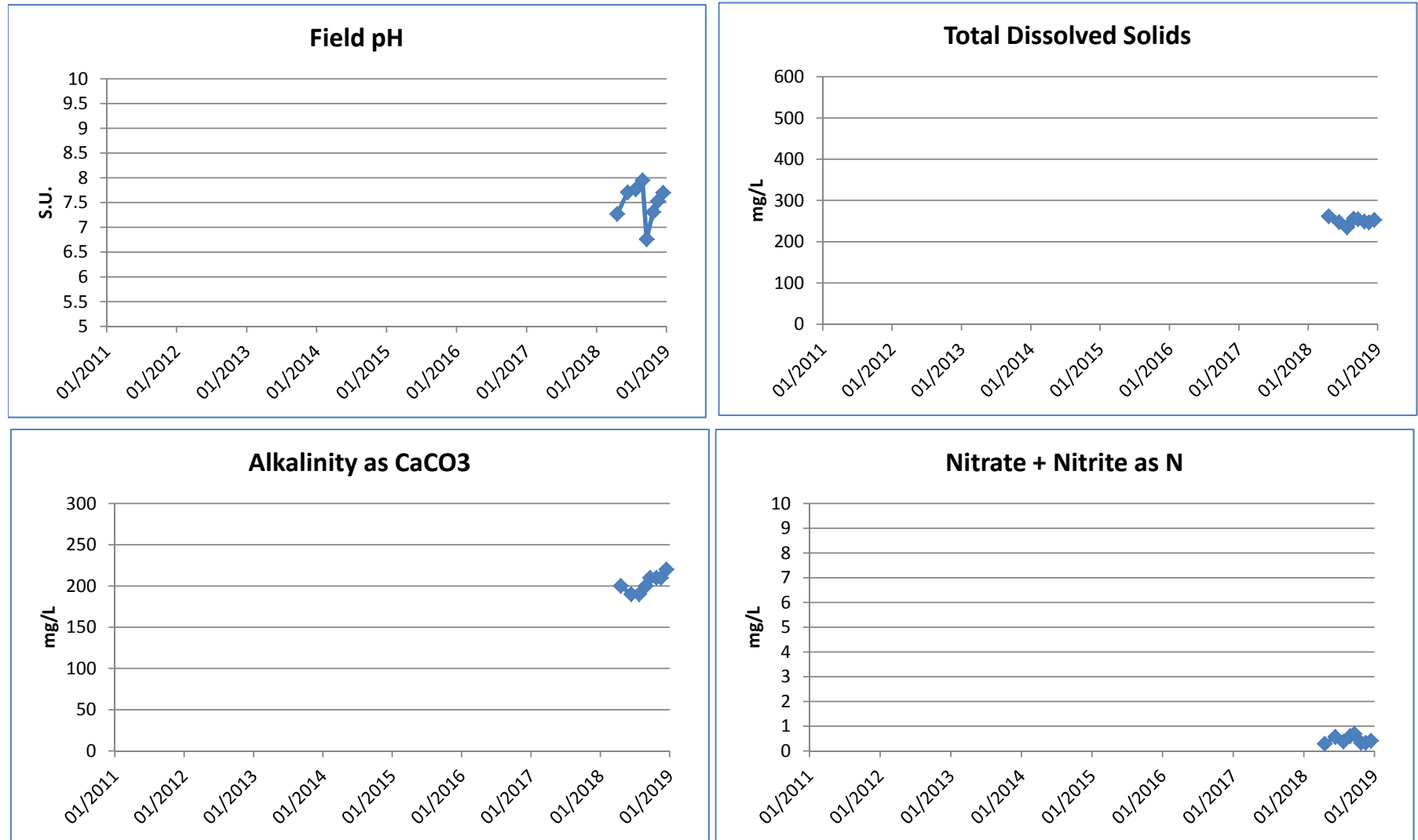
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**SP-11 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

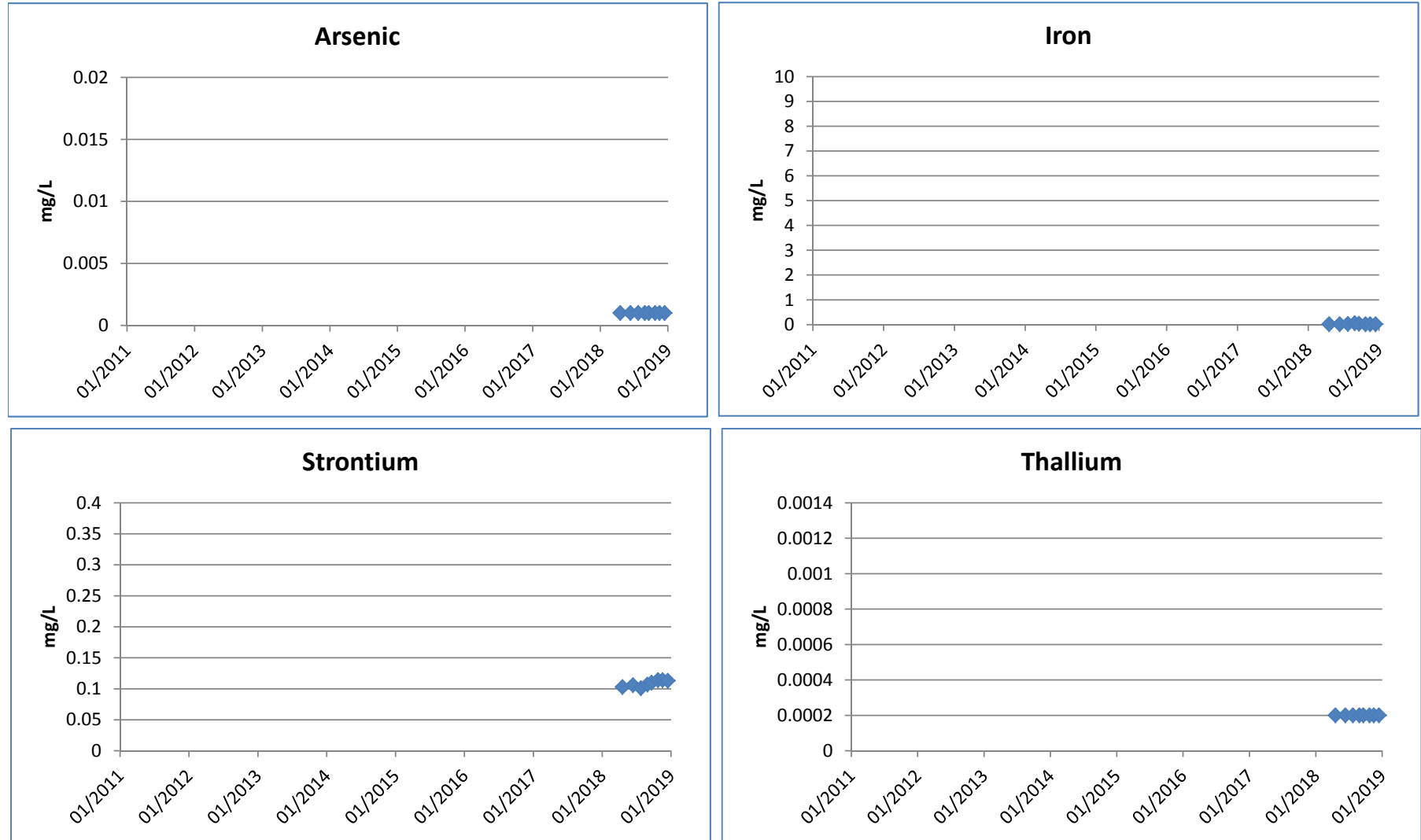
SP-12



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**SP-12 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

SP-12



APPENDIX D

GROUNDWATER QUALITY DATA SUMMARY AND TREND GRAPHS

Station Name	Reporting Units	Human Health Standard Groundwater	MW-1A	MW-1A	MW-1A	MW-1A	MW-1A	MW-1B	MW-1B	MW-1B	MW-1B	MW-1B	MW-1B	MW-2A	MW-2A	MW-2A	MW-2A	MW-2A	MW-2B	MW-2B	MW-2B	MW-2B
Sample Date			3/21/18 15:00	6/11/18 18:50	9/19/18 16:40	11/12/18 13:04	11/13/18 16:05	3/21/18 14:05	6/11/18 19:35	9/19/18 12:10	11/12/18 13:02	11/13/18 16:40	3/20/18 09:15	6/11/18 16:55	9/19/18 17:30	11/12/18 12:43	11/13/18 14:25	3/20/18 09:40	6/11/18 15:28	6/11/18 17:35	9/19/18 18:05	
Sample ID			BBC-1803-221	BBC-1806-204	BBC-1809-209	--	BBC-1811-205	BBC-1803-220	BBC-1806-205	BBC-1809-208	--	BBC-1811-206	BBC-1803-202	BBC-1806-202	BBC-1809-211	--	BBC-1811-203	BBC-1803-203	--	BBC-1806-203	BBC-1809-212	
Lab Name			Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs
Remarks			--	--	--	No Sample	--	--	--	--	No Sample	--	--	--	--	No Sample	--	--	--	No Sample	--	--
Lab Sample ID			H18030348-021	H18060368-005	H18090467-010	--	H18110350-005	H18030348-020	H18060368-006	H18090467-009	--	H18110350-006	H18030348-003	H18060368-003	H18090467-012	--	H18110350-003	H18030348-004	--	H18060368-004	H18090467-013	
Field Parameters																						
Depth To Water	Feet	--	8.78	3.53	7.64	8.03	8.04	24.05	21.91	24.06	23.8	23.73	42.34	41.88	42.13	42.21	42.16	42.24	41.59	41.59	42.04	
Dissolved Oxygen	mg/L	--	9.06	9.2	9.92	--	9.34	0.07	0.1	0.18	--	0.13	7.62	6.03	7.92	--	7.9	0.12	--	0.16	0.17	
EH	Millivolts	--	292.96	305.70	260.77	--	280.70	216.24	238.21	210.66	--	207.59	289.19	278.55	262.77	--	255.99	266.48	--	270.57	230.66	
Field pH	s.u.	--	7.42	7.45	7.23	--	7.4	6.4	6.36	6.31	--	6.4	7.3	7.32	7.17	--	7.37	7.29	--	7.32	7.19	
Field Specific Conductivity	umhos/cm	--	346	342.6	355	--	350	586	604.5	623	--	614	365	379.6	392	--	387	419	--	477.6	453	
Water Temperature	Deg C	--	7.3	7.35	7.8	--	6.5	8	8.11	8.5	--	7.7	7.1	7.48	7.8	--	7.36	7.2	--	7.38	7.9	
Physical Parameters																						
Total Dissolved Solids	mg/L	--	192	201	189	--	193	402	407	436	--	430	206	216	206	--	205	242	--	276	252	
Total Suspended Solids	mg/L	--	50	48	121	--	10 J	94	65	23	--	<10	<10	<10	<10	--	13 J	<10	--	<10	<10	
Major Constituents - Commons Ions																						
Alkalinity as CaCO3	mg/L	--	170	170	170	--	170	98	82	99	--	100	190	180	190	--	190	200	--	220	210	
Calcium (DIS)	mg/L	--	45	43	43	--	43	60	60	62	--	62	44	44	44	--	43	52	--	57	53	
Chloride	mg/L	--	1	1	1	--	1	1	1	<1	--	1	1	1	1	--	1	<1	--	<1	<1	
Fluoride	mg/L	4	0.2	0.2	0.2	--	0.2	0.2	0.2	0.2	--	0.2	0.3	0.4	0.3	--	0.3	0.4	--	0.4	0.4	
Hardness as CaCO3	mg/L	--	188	183	182	--	183	275	279	291	--	288	206	206	206	--	204	246	--	270	249	
Magnesium (DIS)	mg/L	--	19	18	18	--	18	31	31	33	--	32	23	23	23	--	23	28	--	31	29	
Potassium (DIS)	mg/L	--	<1	1	1	--	<1	3	3	3	--	3	1	1	1	--	1	1	--	2	2	
Sodium (DIS)	mg/L	--	2	2	2	--	2	6	7	3	--	3	2	2	3	--	2	3	--	3	3	
Sulfate	mg/L	--	12	12	13	--	14	204	204	222	--	221	20	21	20	--	21	37	--	45	39	
Nutrients																						
Nitrate + Nitrite as N	mg/L	10	0.46	0.47	0.48	--	0.42	0.07	0.03	0.05	--	0.04	0.22	0.18	0.23	--	0.21	<0.01	--	<0.01	<0.01	
Metals - Trace Constituents																						
Aluminum (DIS)	mg/L	--	0.075 J	0.81	0.009	--	<0.009	0.017 J	<0.009	0.013	--	<0.009	<0.009	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	
Antimony (DIS)	mg/L	0.006	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	0.0006	0.0008	--	0.0007	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	
Arsenic (DIS)	mg/L	0.01	<0.001	<0.001	<0.001	--	<0.001	0.056	0.059	0.068	--	0.071	<0.001	<0.001	<0.001	--	<0.001	0.003	--	0.003	0.003	
Barium (DIS)	mg/L	1	0.176	0.204	0.167	--	0.173	0.016	0.021	0.011	--	0.011	0.084	0.086	0.082	--	0.082	0.044	--	0.04	0.041	
Beryllium (DIS)	mg/L	0.004	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	
Cadmium (DIS)	mg/L	0.005	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	
Chromium (DIS)	mg/L	0.1	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	
Cobalt (DIS)	mg/L	--	<0.01	<0.01	<0.01	--	<0.01	0.02	0.02	0.02	--	0.03	<0.01	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	
Copper (DIS)	mg/L	1.3	0.007	0.016	0.007	--	0.008	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	
Iron (DIS)	mg/L	--	0.05	0.74	<0.02	--	<0.02	17.7	18.6	20	--	20.4	0.03	0.03	<0.02	--	<0.02	0.02	--	0.07	0.04	
Lead (DIS)	mg/L	0.015	0.0007	0.0069	<0.0003	--	0.0004	0.0004	0.0006	<0.0003	--	<0.0003	<0.0003	0.0004	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	
Manganese (DIS)	mg/L	--	<0.005	0.006	<0.005	--	<0.005	0.075 J	0.075	0.078	--	0.084	<0.005	<0.005	<0.005	--	<0.005	0.008 J	--	0.015	0.011	
Mercury (DIS)	mg/L	0.002	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	
Molybdenum (DIS)	mg/L	--	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	
Nickel (DIS)	mg/L	0.1	<0.001	<0.001	<0.001	--	<0.001	0.011	0.011	0.011	--	0.012	<0.001	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	
Selenium (DIS)	mg/L	0.05	<0.0002	<0.0002	0.0002	--	0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	0.0013	0.001	0.0013	--	0.0011	0.0048	--	0.0046	0.0051	
Silver (DIS)	mg/L	0.1	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	
Strontium (DIS)	mg/L	4	0.0966	0.101	0.0985	--	0.1	1.6	1.61	1.76	--	1.72	0.0915	0.0897	0.0896	--	0.0906	0.0984	--	0.104	0.0958	
Thallium (DIS)	mg/L	0.002	0.0009	0.0019	0.001	--	0.001	0.0134	0.0154	0.0118	--	0.0125	0.0002	0.0003	0.0002	--	0.0002	0.0038	--	0.0038	0.0036	
Uranium (DIS)	mg/L	0.03	<0.008	<0.008	<0.008	--	0.0009	<0.008	<0.008	<0.008	--	<0.0002	<0.008	<0.008	<0.008	--	0.0005	<0.008	--	<0.008	<0.008	
Zinc (DIS)	mg/L	2	<0.002	0.008	<0.002	--	<0.002	0.014 J	0.013	0.012	--	0.013	<0.002	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:
Human Health Standard Groundwater

Source:
Montana DEQ-7 May 2017

Station Name	Reporting Units	Human Health Standard Groundwater	MW-2B	MW-2B	MW-2B	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4B	MW-4B	MW-4B
Sample Date			9/19/18 18:15	11/12/18 12:45	11/13/18 14:50	3/19/18 15:45	6/11/18 12:20	6/11/18 13:40	9/20/18 10:20	11/12/18 12:25	11/13/18 11:10	3/21/18 12:40	6/13/18 16:40	6/13/18 17:35	9/18/18 10:10	11/12/18 15:45	11/14/18 09:40	3/21/18 13:00	6/13/18 18:00	9/18/18 10:40
Sample ID			BBC-1809-213	--	BBC-1811-204	BBC-1803-200	--	BBC-1806-200	BBC-1809-218	--	BBC-1811-201	BBC-1803-218	--	BBC-1806-221	BBC-1809-201	--	BBC-1811-210	BBC-1803-219	BBC-1806-222	BBC-1809-202
Lab Name			Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks			Duplicate	No Sample	--	--	No Sample	--	--	No Sample	--	--	No Sample	--	--	No Sample	--	--	--	--
Lab Sample ID			H18090467-014	--	H18110350-004	H18030348-001	--	H18060368-001	H18090538-002	--	H18110350-001	H18030348-018	--	H18060368-022	H18090467-002	--	H18110350-010	H18030348-019	H18060368-023	H18090467-003
Field Parameters																				
Depth To Water	Feet	--	42.04	42.09	42.05	43.35	39.31	39.29	41.11	40.9	40.88	5.08	4.5	4.47	4.73	4.59	4.6	4.6	4.01	4.22
Dissolved Oxygen	mg/L	--	0.2	--	10.26	0.01	--	0.09	0.22	--	0.55	0.83	--	0.34	0.22	--	0.11	0.71	0.17	0.24
EH	Millivolts	--	223.74	--	246.94	192.54	--	222.03	152.22	--	173.29	245.25	--	-380.47	206.60	--	230.31	167.53	347.68	161.51
Field pH	s.u.	--	7.19	--	7.3	7.21	--	7.11	7.08	--	7.17	6.98	--	7.51	7.19	--	7.33	7.48	7.49	7.31
Field Specific Conductivity	umhos/cm	--	463	--	192	727	--	779.7	792	--	788	502	--	501	528	--	524	444	440	443
Water Temperature	Deg C	--	8	--	7.23	9.2	--	9.55	9.9	--	8.9	4.4	--	5.1	8.8	--	7	5.7	6	7
Physical Parameters																				
Total Dissolved Solids	mg/L	--	248	--	242	536	--	544	524	--	543	271	--	293	311	--	296	235	251	263
Total Suspended Solids	mg/L	--	<10	--	<10	<10	--	<10	<10	--	<10	<10	--	<10	<10	--	<10	<10	<10	<10
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	210	--	200	210	--	210	220	--	210	260	--	260	270	--	270	230	220	230
Calcium (DIS)	mg/L	--	52	--	49	75	--	77	67	--	72	76	--	79	80	--	80	64	66	63
Chloride	mg/L	--	<1	--	1	1	--	1	1	--	1	3	--	3	3	--	3	2	2	2
Fluoride	mg/L	4	0.4	--	0.3	0.8	--	0.8	0.8	--	0.8	0.1	--	0.1	0.1	--	0.1	0.1	0.1	0.1
Hardness as CaCO3	mg/L	--	246	--	234	391	--	406	361	--	365	273	--	286	289	--	287	243	250	238
Magnesium (DIS)	mg/L	--	28	--	27	49	--	52	47	--	50	20	--	22	22	--	21	20	21	20
Potassium (DIS)	mg/L	--	2	--	1	3	--	3	4	--	3	1	--	1	2	--	1	1	1	1
Sodium (DIS)	mg/L	--	3	--	3	16	--	15	17	--	14	3	--	3	3	--	3	2	2	2
Sulfate	mg/L	--	39	--	38	222	--	218	213	--	221	11	--	12	11	--	13	12	13	13
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	0.06	0.05	0.07
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	<0.009	<0.009
Antimony (DIS)	mg/L	0.006	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic (DIS)	mg/L	0.01	0.003	--	0.003	0.08	--	0.069	0.067	--	0.074	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001
Barium (DIS)	mg/L	1	0.041	--	0.043	0.014	--	0.011	0.012	--	0.011	0.181	--	0.177	0.192	--	0.188	0.13	0.128	0.124
Beryllium (DIS)	mg/L	0.004	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008
Cadmium (DIS)	mg/L	0.005	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003
Chromium (DIS)	mg/L	0.1	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01
Cobalt (DIS)	mg/L	--	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01
Copper (DIS)	mg/L	1.3	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002
Iron (DIS)	mg/L	--	0.04	--	0.03	1.14	--	1.05	1	--	1.04	0.03	--	0.04	0.03	--	0.02	<0.02	<0.02	<0.02
Lead (DIS)	mg/L	0.015	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	<0.0003	<0.0003
Manganese (DIS)	mg/L	--	0.011	--	0.009	0.024 J	--	0.018	0.026	--	0.017	0.238 J	--	0.226	0.329	--	0.288	<0.005	<0.005	<0.005
Mercury (DIS)	mg/L	0.002	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005
Molybdenum (DIS)	mg/L	--	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002
Nickel (DIS)	mg/L	0.1	<0.001	--	<0.001	0.001	--	<0.001	0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001
Selenium (DIS)	mg/L	0.05	0.005	--	0.0046	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002
Silver (DIS)	mg/L	0.1	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002
Strontium (DIS)	mg/L	4	0.0944	--	0.0931	13.4	--	13.2	13.1	--	12.6	0.173	--	0.17	0.179	--	0.174	0.174	0.174	0.167
Thallium (DIS)	mg/L	0.002	0.0037	--	0.0036	0.0005	--	0.0004	0.0004	--	0.0004	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002
Uranium (DIS)	mg/L	0.03	<0.008	--	0.0022	<0.008	--	<0.008	<0.008	--	0.0011	<0.008	--	<0.008	<0.008	--	0.0004	<0.008	<0.008	<0.008
Zinc (DIS)	mg/L	2	<0.002	--	<0.002	<0.002	--	<0.002	0.004	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:
Human Health Standard Groundwater

Station Name	Reporting Units	Human Health Standard Groundwater	MW-4B	MW-4B	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6B	MW-6B	MW-6B	MW-6B	MW-6B	MW-6B	MW-7	MW-7	MW-7	MW-7
Sample Date			11/12/18 15:46	11/14/18 09:15	3/20/18 10:30	6/12/18 15:05	6/14/18 14:50	9/20/18 13:45	11/12/18 14:42	11/14/18 12:35	3/20/18 11:00	6/12/18 15:02	6/14/18 15:10	9/20/18 14:30	11/12/18 14:40	11/14/18 13:25	3/20/18 11:50	6/14/18 17:15	9/20/18 15:30	11/12/18 14:35
Sample ID			--	BBC-1811-209	BBC-1803-204	--	BBC-1806-228	BBC-1809-221	--	BBC-1811-213	BBC-1803-205	--	BBC-1806-229	BBC-1809-222	--	BBC-1811-214	BBC-1803-206	BBC-1806-231	BBC-1809-223	--
Lab Name			HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO
Remarks			No Sample	--	--	No Sample	--	--	No Sample	--	--	No Sample	--	--	No Sample	--	--	--	--	No Sample
Lab Sample ID			--	H18110350-009	H18030348-005	--	H18060368-029	H18090538-005	--	H18110402-002	H18030348-006	--	H18060368-030	H18090538-006	--	H18110402-003	H18030348-007	H18060368-032	H18090538-007	--
Field Parameters																				
Depth To Water	Feet	--	4.08	4.06	9.46	6.69	6.78	8.45	8.34	8.39	12.62	9.87	10	11.62	11.53	11.59	33.49	31.03	31.97	31.13
Dissolved Oxygen	mg/L	--	--	0.2	3.89	--	6.85	6.02	--	5.43	2.29	--	3.26	2.56	--	3.15	0.19	0.95	2.4	--
EH	Millivolts	--	--	233.45	278.71	--	416.95	350.62	--	240.46	256.18	--	413.78	306.96	--	246.03	244.51	193.20	201.47	--
Field pH	s.u.	--	--	7.55	7.6	--	7.46	7.63	--	7.64	7.69	--	7.53	7.71	--	7.75	7.3	7.54	7.54	--
Field Specific Conductivity	umhos/cm	--	--	447	437	--	421	430	--	454	443	--	457	462	--	466	517	546	555	--
Water Temperature	Deg C	--	--	6.2	5.8	--	6.2	8.1	--	7.9	6.6	--	6	6.7	--	6.9	7.6	8.8	8.4	--
Physical Parameters																				
Total Dissolved Solids	mg/L	--	--	247	247	--	227	239	--	254	248	--	243	258	--	266	314	314	319	--
Total Suspended Solids	mg/L	--	--	<10	11	--	15	<10	--	109 J	35	--	<10	23	--	63 J	<10	<10	14	--
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	--	230	240	--	210	230	--	230	230	--	220	230	--	230	230	220	230	--
Calcium (DIS)	mg/L	--	--	58	59	--	54	52	--	57	49	--	47	43	--	49	59	59	54	--
Chloride	mg/L	--	--	2	<1	--	1	<1	--	<1	<1	--	<1	<1	--	<1	4	4	4	--
Fluoride	mg/L	4	--	0.1	0.2	--	0.2	0.2	--	0.2	0.6	--	0.5	0.7	--	0.8	0.3	0.3	0.3	--
Hardness as CaCO3	mg/L	--	--	222	253	--	234	230	--	249	223	--	212	202	--	223	303	300	291	--
Magnesium (DIS)	mg/L	--	--	18	26	--	24	24	--	26	24	--	23	23	--	25	38	37	38	--
Potassium (DIS)	mg/L	--	--	1	<1	--	<1	<1	--	<1	1	--	1	1	--	1	1	1	1	--
Sodium (DIS)	mg/L	--	--	3	3	--	3	3	--	3	17	--	16	21	--	17	3	3	3	--
Sulfate	mg/L	--	--	14	18	--	11	16	--	18	24	--	19	26	--	29	70	64	72	--
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	--	0.06	0.07	--	0.19	0.16	--	0.12	0.06	--	0.14	0.1	--	0.08	<0.01	<0.01	<0.01	--
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	0.016 J	0.074	<0.009	--
Antimony (DIS)	mg/L	0.006	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--
Arsenic (DIS)	mg/L	0.01	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	0.002	0.002	0.002	--
Barium (DIS)	mg/L	1	--	0.129	0.188	--	0.166	0.185	--	0.194	0.103	--	0.099	0.084	--	0.107	0.044	0.044	0.041	--
Beryllium (DIS)	mg/L	0.004	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	--
Cadmium (DIS)	mg/L	0.005	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	0.00004	--
Chromium (DIS)	mg/L	0.1	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--
Cobalt (DIS)	mg/L	--	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--
Copper (DIS)	mg/L	1.3	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--
Iron (DIS)	mg/L	--	--	<0.02	<0.02	--	0.03	<0.02	--	<0.02	<0.02	--	<0.02	<0.02	--	<0.02	0.06	0.22	0.04	--
Lead (DIS)	mg/L	0.015	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	0.0005	0.0037	<0.0003	--
Manganese (DIS)	mg/L	--	--	<0.005	<0.005	--	<0.005	<0.005	--	<0.005	0.007 J	--	<0.005	0.006	--	0.006	0.026 J	0.021	0.02	--
Mercury (DIS)	mg/L	0.002	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	--
Molybdenum (DIS)	mg/L	--	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	0.002	<0.002	0.002	--
Nickel (DIS)	mg/L	0.1	--	<0.001	<0.001	--	0.002	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	--
Selenium (DIS)	mg/L	0.05	--	<0.0002	<0.0002	--	<0.0002	0.0002	--	0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--
Silver (DIS)	mg/L	0.1	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--
Strontium (DIS)	mg/L	4	--	0.172	0.175	--	0.154	0.164	--	0.17	0.253	--	0.242	0.258	--	0.246	0.172	0.167	0.165	--
Thallium (DIS)	mg/L	0.002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--
Uranium (DIS)	mg/L	0.03	--	0.0006	<0.008	--	<0.008	<0.008	--	0.0007	<0.008	--	<0.008	<0.008	--	0.0007	<0.008	<0.008	<0.008	--
Zinc (DIS)	mg/L	2	--	<0.002	<0.002	--	0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	0.003	<0.002	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

Human Health Standard Groundwater

Station Name	Reporting Units	Human Health Standard Groundwater	MW-7	MW-8	MW-8	MW-8	MW-8	MW-8	MW-8	MW-9	MW-9	MW-9	MW-9	MW-9	MW-10	MW-10	MW-10	MW-10	MW-10
Sample Date			11/14/18 14:25	3/20/18 14:10	6/12/18 11:20	6/12/18 11:35	9/20/18 17:15	11/12/18 14:25	11/14/18 15:50	3/19/18 17:20	6/11/18 15:50	9/20/18 12:35	11/12/18 12:27	11/13/18 12:55	3/21/18 10:00	6/14/18 11:25	9/21/18 11:05	11/12/18 13:55	11/15/18 12:20
Sample ID			BBC-1811-216	BBC-1803-208	BBC-1806-208	BBC-1806-209	BBC-1809-225	--	BBC-1811-218	BBC-1803-201	BBC-1806-201	BBC-1809-219	--	BBC-1811-202	BBC-1803-213	BBC-1806-223	BBC-1809-229	--	BBC-1811-225
Lab Name			Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs
Remarks			--	--	--	Duplicate	--	No Sample	--	--	--	--	No Sample	--	--	--	--	No Sample	--
Lab Sample ID			H18110402-005	H18030348-009	H18060368-009	H18060368-010	H18090538-009	--	H18110402-007	H18030348-002	H18060368-002	H18090538-003	--	H18110350-002	H18030348-014	H18060368-024	H18090538-013	--	H18110402-014
Field Parameters																			
Depth To Water	Feet	--	32.05	32.74	27.88	--	30.27	31.3	31.43	51.55	46.89	50.07	51.19	51.18	82.88	64.92	74.47	77.18	77.27
Dissolved Oxygen	mg/L	--	0.49	0.04	0.07	0.08	0.1	--	0.21	0.06	0.07	0.17	--	0.04	6.52	7.52	7.61	--	7.99
EH	Millivolts	--	211.01	124.66	134.86	134.86	119.18	--	117.06	195.02	227.53	172.80	--	192.67	297.43	293.67	276.25	--	253.68
Field pH	s.u.	--	7.57	8.08	8.05	8.06	7.97	--	8.05	7.13	7.03	6.99	--	7.06	7.61	7.95	8.03	--	8.04
Field Specific Conductivity	umhos/cm	--	555	294	309	309	310	--	308	755	779.9	805	--	800	337	321	339	--	346
Water Temperature	Deg C	--	8.2	7.3	7.3	7.3	7.2	--	7.3	8.7	8.86	9.4	--	8.4	6.3	9	9.7	--	7.88
Physical Parameters																			
Total Dissolved Solids	mg/L	--	328	161	164	165	166	--	162	517	534	515	--	531	189	190	184	--	187
Total Suspended Solids	mg/L	--	380 J	16	<10	<10	46	--	<10	<10	<10	<10	--	<10	205	<10	14	--	27 J
Major Constituents - Commons Ions																			
Alkalinity as CaCO3	mg/L	--	260	150	150	150	150	--	150	240	240	250	--	250	180	180	180	--	180
Calcium (DIS)	mg/L	--	62	27	27	27	24	--	26	89	91	79	--	87	41	44	42	--	45
Chloride	mg/L	--	4	<1	<1	<1	<1	--	<1	1	1	1	--	1	<1	<1	<1	--	<1
Fluoride	mg/L	4	0.3	0.2	0.2	0.2	0.2	--	0.2	0.6	0.6	0.6	--	0.5	0.3	0.2	0.2	--	0.2
Hardness as CaCO3	mg/L	--	311	167	165	164	158	--	164	436	452	399	--	389	172	183	178	--	179
Magnesium (DIS)	mg/L	--	38	24	24	24	23	--	24	52	54	49	--	46	17	18	18	--	16
Potassium (DIS)	mg/L	--	1	<1	<1	<1	<1	--	<1	4	4	5	--	4	2	2	2	--	2
Sodium (DIS)	mg/L	--	3	3	3	3	3	--	3	5	6	6	--	5	6	6	6	--	6
Sulfate	mg/L	--	76	14	14	14	16	--	16	196	192	199	--	200	4	3	4	--	4
Nutrients																			
Nitrate + Nitrite as N	mg/L	10	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	0.54	0.53	0.57	--	0.53
Metals - Trace Constituents																			
Aluminum (DIS)	mg/L	--	<0.009	0.011 J	<0.009	<0.009	0.015	--	<0.009	<0.009	<0.009	<0.009	--	<0.009	0.02 J	0.214	0.029	--	0.013
Antimony (DIS)	mg/L	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005
Arsenic (DIS)	mg/L	0.01	0.002	0.002	0.002	0.002	0.002	--	0.002	0.014	0.015	0.012	--	0.013	<0.001	<0.001	<0.001	--	<0.001
Barium (DIS)	mg/L	1	0.04	0.08	0.076	0.078	0.078	--	0.08	0.014	0.015	0.014	--	0.015	0.187	0.196	0.192	--	0.194
Beryllium (DIS)	mg/L	0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	--	<0.0008
Cadmium (DIS)	mg/L	0.005	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	--	<0.00003
Chromium (DIS)	mg/L	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01
Cobalt (DIS)	mg/L	--	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01
Copper (DIS)	mg/L	1.3	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002
Iron (DIS)	mg/L	--	0.07	0.11	0.11	0.11	0.09	--	0.1	0.84	0.83	0.84	--	0.9	<0.02	0.21	<0.02	--	<0.02
Lead (DIS)	mg/L	0.015	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	<0.0003	0.0024	0.012	0.0062	--	0.0063	<0.0003	0.0006	<0.0003	--	<0.0003
Manganese (DIS)	mg/L	--	0.016	0.025 J	0.014	0.012	0.02	--	0.013	0.091 J	0.094	0.092	--	0.088	<0.005	0.022	<0.005	--	0.005
Mercury (DIS)	mg/L	0.002	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005
Molybdenum (DIS)	mg/L	--	0.002	0.003	<0.002	<0.002	0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	0.006	0.004	0.005	--	0.005
Nickel (DIS)	mg/L	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	--	<0.001	0.002	0.001	0.002	--	0.002
Selenium (DIS)	mg/L	0.05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002
Silver (DIS)	mg/L	0.1	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002
Strontium (DIS)	mg/L	4	0.17	0.0889	0.0854	0.0859	0.0871	--	0.0884	1.24	1.53	1.14	--	1.08	0.989	0.97	0.973	--	0.969
Thallium (DIS)	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	0.0037	0.0045	0.0035	--	0.0036	<0.0002	<0.0002	<0.0002	--	<0.0002
Uranium (DIS)	mg/L	0.03	0.0022	<0.008	<0.008	<0.008	<0.008	--	0.0007	<0.008	<0.008	<0.008	--	0.0009	0.01	<0.008	<0.008	--	0.006
Zinc (DIS)	mg/L	2	<0.002	<0.002	0.003	<0.002	<0.002	--	<0.002	0.002 J	0.004	<0.002	--	0.003	<0.002	0.004	<0.002	--	<0.002

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:
Human Health Standard Groundwater

Station Name	Reporting Units	Human Health Standard Groundwater	MW-11	MW-11	MW-11	MW-11	MW-11	MW-12	MW-12	MW-12	MW-12	MW-12	MW-13	MW-13	MW-13	MW-13	MW-13	MW-14	MW-14	MW-15
Sample Date			3/20/18 17:15	6/14/18 12:25	9/21/18 10:10	11/12/18 13:58	11/15/18 10:15	3/20/18 16:25	6/14/18 09:40	9/20/18 17:55	11/12/18 14:05	11/15/18 09:15	3/20/18 15:25	6/14/18 10:20	9/21/18 11:50	11/12/18 14:10	11/15/18 08:45	6/14/18 11:15	11/12/18 16:35	6/14/18 11:20
Sample ID			BBC-1803-212	BBC-1806-227	BBC-1809-228	--	BBC-1811-223	BBC-1803-211	BBC-1806-224	BBC-1809-227	--	BBC-1811-222	BBC-1803-210	BBC-1806-225	BBC-1809-231	--	BBC-1811-221	--	--	--
Lab Name			Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	HYDRO	HYDRO	HYDRO
Remarks			--	--	--	No Sample	--	--	--	--	No Sample	--	--	--	--	No Sample	--	No Sample	No Sample	No Sample
Lab Sample ID			H18030348-013	H18060368-028	H18090538-012	--	H18110402-012	H18030348-012	H18060368-025	H18090538-011	--	H18110402-011	H18030348-011	H18060368-026	H18090538-015	--	H18110402-010	--	--	--
Field Parameters																				
Depth To Water	Feet	--	37.08	23.38	32.49	33.58	33.63	31.17	21.19	26.2	27.46	27.45	22.5	16.68	20.67	21.3	21.34	36.97	40.07	36.62
Dissolved Oxygen	mg/L	--	5.09	9.1	7.86	--	8.79	7.52	8.43	8.62	--	8.08	6.49	7.64	7.84	--	7.9	--	--	--
EH	Millivolts	--	264.06	280.32	293.82	--	255.64	302.84	304.80	288.61	--	265.01	289.71	299.11	302.18	--	272.88	--	--	--
Field pH	s.u.	--	7.73	7.68	7.62	--	7.71	7.56	7.6	7.17	--	7.6	6.26	7.61	7.29	--	7.58	--	--	--
Field Specific Conductivity	umhos/cm	--	304	297	307	--	323	392	395	414	--	418	401	414	420	--	431	--	--	--
Water Temperature	Deg C	--	7.9	8.1	8.1	--	8	6.8	6.5	6.4	--	6.4	7	6.4	6.6	--	6.6	--	--	--
Physical Parameters																				
Total Dissolved Solids	mg/L	--	181	177	171	--	186	225	224	219	--	227	231	231	224	--	233	--	--	--
Total Suspended Solids	mg/L	--	501	258	58	--	21 J	16	<10	<10	--	<10	19	<10	44	--	24 J	--	--	--
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	170	160	160	--	170	220	210	220	--	210	220	220	220	--	220	--	--	--
Calcium (DIS)	mg/L	--	44	44	44	--	46	60	62	59	--	57	61	63	61	--	57	--	--	--
Chloride	mg/L	--	<1	<1	<1	--	<1	<1	<1	<1	--	<1	<1	<1	<1	--	<1	--	--	--
Fluoride	mg/L	4	0.1	0.1	<0.1	--	<0.1	0.1	0.1	0.1	--	0.1	0.1	0.1	0.1	--	<0.1	--	--	--
Hardness as CaCO3	mg/L	--	161	163	162	--	161	229	239	227	--	221	239	245	240	--	226	--	--	--
Magnesium (DIS)	mg/L	--	12	13	12	--	11	19	20	19	--	19	21	22	21	--	21	--	--	--
Potassium (DIS)	mg/L	--	2	2	2	--	2	<1	<1	<1	--	<1	<1	<1	<1	--	<1	--	--	--
Sodium (DIS)	mg/L	--	6	4	5	--	5	2	2	2	--	2	1	1	1	--	1	--	--	--
Sulfate	mg/L	--	5	4	5	--	5	11	10	12	--	13	16	12	16	--	17	--	--	--
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	0.47	0.53	0.53	--	0.43	0.18	0.15	0.18	--	0.16	0.27	0.2	0.21	--	0.17	--	--	--
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	0.015 J	<0.009	0.031	--	<0.009	<0.009	<0.009	<0.009	--	<0.009	0.013 J	<0.009	0.01	--	<0.009	--	--	--
Antimony (DIS)	mg/L	0.006	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	--	--	--
Arsenic (DIS)	mg/L	0.01	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	--	<0.001	--	--	--
Barium (DIS)	mg/L	1	0.16	0.154	0.156	--	0.163	0.055	0.049	0.051	--	0.053	0.059	0.055	0.056	--	0.057	--	--	--
Beryllium (DIS)	mg/L	0.004	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	--	<0.0008	--	--	--
Cadmium (DIS)	mg/L	0.005	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	--	<0.00003	--	--	--
Chromium (DIS)	mg/L	0.1	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	--	--	--
Cobalt (DIS)	mg/L	--	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	--	<0.01	--	--	--
Copper (DIS)	mg/L	1.3	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	--	--	--
Iron (DIS)	mg/L	--	<0.02	<0.02	<0.02	--	<0.02	<0.02	<0.02	<0.02	--	<0.02	<0.02	<0.02	<0.02	--	<0.02	--	--	--
Lead (DIS)	mg/L	0.015	<0.0003	<0.0003	<0.0003	--	<0.0003	<0.0003	<0.0003	<0.0003	--	<0.0003	<0.0003	<0.0003	<0.0003	--	<0.0003	--	--	--
Manganese (DIS)	mg/L	--	<0.005	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.005	--	<0.005	--	--	--
Mercury (DIS)	mg/L	0.002	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	--	--	--
Molybdenum (DIS)	mg/L	--	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	--	--	--
Nickel (DIS)	mg/L	0.1	0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	--	<0.001	--	--	--
Selenium (DIS)	mg/L	0.05	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	0.0002	<0.0002	0.0002	--	0.0002	--	--	--
Silver (DIS)	mg/L	0.1	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Strontium (DIS)	mg/L	4	0.639	0.954	0.645	--	0.351	0.149	0.141	0.139	--	0.143	0.109	0.102	0.101	--	0.104	--	--	--
Thallium (DIS)	mg/L	0.002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	--	--	--
Uranium (DIS)	mg/L	0.03	<0.008	<0.008	<0.008	--	0.0016	<0.008	<0.008	<0.008	--	0.0008	<0.008	<0.008	<0.008	--	0.0005	--	--	--
Zinc (DIS)	mg/L	2	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	--	<0.002	0.002 J	<0.002	<0.002	--	<0.002	--	--	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:

Human Health Standard Groundwater

Station Name	Reporting Units	Human Health Standard Groundwater	MW-15	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-16	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-17	MW-18	MW-18
Sample Date			11/12/18 16:45	1/24/18 15:50	3/21/18 15:45	6/11/18 15:15	6/12/18 09:50	9/20/18 17:55	11/12/18 13:15	11/13/18 17:20	11/13/18 17:40	1/24/18 12:55	3/19/18 13:10	6/12/18 15:57	6/14/18 18:30	9/21/18 12:50	11/12/18 14:55	11/14/18 10:50	1/24/18 15:00	3/21/18 10:35
Sample ID			--	BBC-1801-205	BBC-1803-222	--	BBC-1806-206	BBC-1809-226	--	BBC-1811-207	BBC-1811-208	BBC-1801-200	BBC-1803-227	--	BBC-1806-232	BBC-1809-232	--	BBC-1811-211	BBC-1801-204	BBC-1803-216
Lab Name			HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs
Remarks			No Sample	--	--	No Sample	--	--	No Sample	--	Duplicate	No Sample	No Sample	No Sample	--	--	No Sample	--	--	--
Lab Sample ID			--	H18010387-005	H18030348-022	--	H18060368-007	H18090538-010	--	H18110350-007	H18110350-008	--	--	--	H18060368-033	H18090538-016	--	H18110350-011	H18010387-004	H18030348-016
Field Parameters																				
Depth To Water	Feet	--	NM	8.75	8.21	5.17	5.41	8.42	6.78	7.77	7.77	60.28	60.3	44.91	44.91	50.34	52.11	51.98	19.04	19.47
Dissolved Oxygen	mg/L	--	--	0.26	0.01	--	0.06	0.25	--	0.32	0.4	8.4	--	--	5.82	6.6	--	6.23	8.43	8.52
EH	Millivolts	--	--	--	172.38	--	187.23	182.78	--	161.88	163.26	--	--	--	260.44	285.01	--	241.75	--	278.83
Field pH	s.u.	--	--	7.14	7.3	--	7.33	7.29	--	7.29	7.28	8	--	--	7.75	7.65	--	7.73	7.73	7.82
Field Specific Conductivity	umhos/cm	--	--	647	653	--	568	616	--	624	634	649	--	--	385	380	--	386	373	365
Water Temperature	Deg C	--	--	6.7	6.6	--	6.9	6.6	--	6.6	6.7	7	--	--	7.4	7	--	6.2	7.3	6.3
Physical Parameters																				
Total Dissolved Solids	mg/L	--	--	395	390	--	329	380	--	384	378	--	--	--	213	198	--	212	211	202
Total Suspended Solids	mg/L	--	--	18	27	--	18	<10	--	82 J	57 J	--	--	--	<10	<10	--	<10	71	47
Major Constituents - Commons Ions																				
Alkalinity as CaCO3	mg/L	--	--	240	250	--	220	250	--	250	250	--	--	--	200	200	--	200	190	190
Calcium (DIS)	mg/L	--	--	78	78	--	74	67	--	71	70	--	--	--	45	45	--	45	51	49
Chloride	mg/L	--	--	1	1	--	2	1	--	1	1	--	--	--	2	2	--	2	<1	<1
Fluoride	mg/L	4	--	0.5	0.5	--	0.5	0.5	--	0.5	0.5	--	--	--	0.3	0.3	--	0.3	<0.1	<0.1
Hardness as CaCO3	mg/L	--	--	368	362	--	347	326	--	333	325	--	--	--	213	214	--	212	210	199
Magnesium (DIS)	mg/L	--	--	42	41	--	40	38	--	38	37	--	--	--	24	25	--	25	20	19
Potassium (DIS)	mg/L	--	--	3	3	--	3	3	--	3	3	--	--	--	<1	<1	--	<1	<1	<1
Sodium (DIS)	mg/L	--	--	4	4	--	4	4	--	4	4	--	--	--	2	2	--	2	2	2
Sulfate	mg/L	--	--	107	107	--	72	103	--	104	102	--	--	--	8	8	--	9	8	8
Nutrients																				
Nitrate + Nitrite as N	mg/L	10	--	<0.01	0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	--	--	0.49	0.5	--	0.44	0.17	0.18
Metals - Trace Constituents																				
Aluminum (DIS)	mg/L	--	--	0.012	0.208 J	--	0.058	<0.009	--	0.014	0.018	--	--	--	0.039	<0.009	--	<0.009	0.028	0.061 J
Antimony (DIS)	mg/L	0.006	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	--	--	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005
Arsenic (DIS)	mg/L	0.01	--	0.005	0.006	--	0.006	0.006	--	0.006	0.006	--	--	--	<0.001	<0.001	--	<0.001	<0.001	<0.001
Barium (DIS)	mg/L	1	--	0.026	0.025	--	0.019	0.02	--	0.02	0.02	--	--	--	0.423	0.258	--	0.262	0.094	0.096
Beryllium (DIS)	mg/L	0.004	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	--	--	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008
Cadmium (DIS)	mg/L	0.005	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	--	--	<0.00003	<0.00003	--	<0.00003	<0.00003	0.00003
Chromium (DIS)	mg/L	0.1	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	--	--	<0.01	<0.01	--	<0.01	<0.01	<0.01
Cobalt (DIS)	mg/L	--	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	--	--	<0.01	<0.01	--	<0.01	<0.01	<0.01
Copper (DIS)	mg/L	1.3	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	--	--	<0.002	<0.002	--	<0.002	<0.002	<0.002
Iron (DIS)	mg/L	--	--	0.91	1.5	--	1.57	1.36	--	1.23	1.25	--	--	--	0.07	<0.02	--	<0.02	0.05	0.08
Lead (DIS)	mg/L	0.015	--	<0.0003	0.0004	--	0.0004	<0.0003	--	<0.0003	<0.0003	--	--	--	0.001	<0.0003	--	<0.0003	0.0003	0.0006
Manganese (DIS)	mg/L	--	--	0.057	0.058 J	--	0.048	0.045	--	0.046	0.046	--	--	--	0.021	<0.005	--	<0.005	0.009	0.007 J
Mercury (DIS)	mg/L	0.002	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	--	--	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005
Molybdenum (DIS)	mg/L	--	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	--	--	<0.002	<0.002	--	<0.002	<0.002	<0.002
Nickel (DIS)	mg/L	0.1	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	--	--	0.002	<0.001	--	<0.001	<0.001	<0.001
Selenium (DIS)	mg/L	0.05	--	0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	--	--	0.0014	0.0011	--	0.0011	0.0004	0.0003
Silver (DIS)	mg/L	0.1	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	--	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002
Strontium (DIS)	mg/L	4	--	0.29 U	0.329	--	0.331	0.309	--	0.285	0.3	--	--	--	0.143	0.112	--	0.11	0.104 U	0.109
Thallium (DIS)	mg/L	0.002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	--	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002
Uranium (DIS)	mg/L	0.03	--	<0.008	<0.008	--	<0.008	<0.008	--	0.0019	0.0019	--	--	--	<0.008	<0.008	--	0.0008	<0.008	<0.008
Zinc (DIS)	mg/L	2	--	0.005	0.016 J	--	0.022	0.005	--	0.007	0.007	--	--	--	0.011	0.006	--	0.006	<0.002	0.002 J

z - no laboratory ID
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NM-ICE = Not measured; ice prohibitive
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Analyte concentration exceeds the standard for:
Human Health Standard Groundwater

Station Name	Reporting Units	Human Health Standard Groundwater	MW-18	MW-18	MW-18	MW-18	MW-18	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-19	MW-20	MW-20	MW-20	MW-20	MW-20
Sample Date			3/21/18 11:00	6/12/18 10:35	9/20/18 13:45	11/12/18 13:44	11/14/18 11:55	1/24/18 14:20	1/24/18 14:40	3/20/18 14:50	6/14/18 10:55	9/21/18 10:55	11/12/18 14:15	11/14/18 16:45	1/24/18 13:40	3/20/18 13:25	6/12/18 12:25	9/20/18 16:20	11/12/18 14:30
Sample ID			BBC-1803-217	BBC-1806-207	BBC-1809-220	--	BBC-1811-212	BBC-1801-202	BBC-1801-203	BBC-1803-209	BBC-1806-226	BBC-1809-230	--	BBC-1811-219	BBC-1801-201	BBC-1803-207	BBC-1806-210	BBC-1809-224	--
Lab Name			Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	HYDRO
Remarks			Duplicate	--	--	No Sample	--	--	Duplicate	--	--	--	No Sample	--	--	--	--	--	No Sample
Lab Sample ID			H18030348-017	H18060368-008	H18090538-004	--	H18110402-001	H18010387-002	H18010387-003	H18030348-010	H18060368-027	H18090538-014	--	H18110402-008	H18010387-001	H18030348-008	H18060368-011	H18090538-008	--
Field Parameters																			
Depth To Water	Feet	--	--	10.13	16.21	16.77	16.87	15.28	--	15.54	8.51	13.54	14.09	14.12	25.49	25.93	18.12	21.26	22.7
Dissolved Oxygen	mg/L	--	--	7.79	8.58	--	8.37	6.94	--	6.69	7.26	6.96	--	7.38	7.4	7.06	9.5	9.51	--
EH	Millivolts	--	--	280.37	282.39	--	249.14	--	--	278.50	293.96	340.72	--	251.79	--	267.21	272.28	278.77	--
Field pH	s.u.	--	--	7.78	7.16	--	7.76	7.47	--	7.53	7.54	7.79	--	7.54	7.66	7.76	7.79	7.4	--
Field Specific Conductivity	umhos/cm	--	--	355	372	--	375	417	--	386	352	408	--	402	410	380	383	399	--
Water Temperature	Deg C	--	--	4.9	7.1	--	7.4	7.2	--	6.5	6.7	8.1	--	7.7	8.1	7.6	7.2	7.8	--
Physical Parameters																			
Total Dissolved Solids	mg/L	--	199	200	207	--	220	234	235	220	212	221	--	227	225	217	216	198 D	--
Total Suspended Solids	mg/L	--	30	<10	<10	--	38 J	37	27	23	13	<10	--	27 J	238	64	143	464 D	--
Major Constituents - Commons Ions																			
Alkalinity as CaCO3	mg/L	--	190	190	200	--	200	200	200	210	190	210	--	210	210	210	200	270	--
Calcium (DIS)	mg/L	--	49	50	45	--	48	57	56	55	51	56	--	56	51	50	47	43	--
Chloride	mg/L	--	<1	<1	<1	--	<1	<1	<1	<1	1	<1	--	<1	<1	<1	<1	<1	--
Fluoride	mg/L	4	<0.1	<0.1	0.1	--	<0.1	0.1	0.1	0.1	0.1	0.1	--	0.1	<0.1	0.1	<0.1	0.1	--
Hardness as CaCO3	mg/L	--	200	206	190	--	199	230	229	222	210	227	--	228	229	222	213	200	--
Magnesium (DIS)	mg/L	--	19	20	19	--	19	22	21	20	20	21	--	21	25	23	23	22	--
Potassium (DIS)	mg/L	--	<1	<1	<1	--	<1	<1	<1	<1	<1	<1	--	<1	1	<1	<1	1	--
Sodium (DIS)	mg/L	--	2	2	2	--	2	3	3	3	2	2	--	2	2	1	1	1	--
Sulfate	mg/L	--	8	5	8	--	8	16	16	15	11	14	--	15	10	10	7	9	--
Nutrients																			
Nitrate + Nitrite as N	mg/L	10	0.18	0.22	0.2	--	0.18	0.18	0.18	0.19	0.48	0.26	--	0.2	0.28	0.29	0.4	0.36	--
Metals - Trace Constituents																			
Aluminum (DIS)	mg/L	--	0.08 J	<0.009	<0.009	--	0.014	0.019	0.023	0.019 J	0.054	<0.009	--	0.009	0.045	<0.009	0.01	<0.009	--
Antimony (DIS)	mg/L	0.006	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	--
Arsenic (DIS)	mg/L	0.01	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	--
Barium (DIS)	mg/L	1	0.096	0.094	0.104	--	0.104	0.092	0.093	0.095	0.079	0.091	--	0.095	0.199	0.207	0.175	0.196	--
Beryllium (DIS)	mg/L	0.004	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	--
Cadmium (DIS)	mg/L	0.005	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	--
Chromium (DIS)	mg/L	0.1	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	--
Cobalt (DIS)	mg/L	--	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	--
Copper (DIS)	mg/L	1.3	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	--
Iron (DIS)	mg/L	--	0.1	<0.02	<0.02	--	<0.02	0.02	0.03	<0.02	0.06	<0.02	--	<0.02	0.04	<0.02	0.02	<0.02	--
Lead (DIS)	mg/L	0.015	0.0008	<0.0003	<0.0003	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	--
Manganese (DIS)	mg/L	--	0.011 J	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	--	<0.005	<0.005	<0.005	<0.005	<0.005	--
Mercury (DIS)	mg/L	0.002	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	--
Molybdenum (DIS)	mg/L	--	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	--
Nickel (DIS)	mg/L	0.1	0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	0.001	0.001	<0.001	--
Selenium (DIS)	mg/L	0.05	0.0003	0.0002	0.0003	--	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	0.0003	0.0003	0.0002	0.0002	--
Silver (DIS)	mg/L	0.1	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--
Strontium (DIS)	mg/L	4	0.109	0.0996	0.108	--	0.109	0.143 U	0.143	0.155	0.153	0.152	--	0.157	0.0732 U	0.078	0.0673	0.0704	--
Thallium (DIS)	mg/L	0.002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	--
Uranium (DIS)	mg/L	0.03	<0.008	<0.008	<0.008	--	0.0005	<0.008	<0.008	<0.008	<0.008	<0.008	--	0.0007	<0.008	<0.008	<0.008	<0.008	--
Zinc (DIS)	mg/L	2	0.007 J	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	0.004	<0.002	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:
Human Health Standard Groundwater

Station Name	Reporting Units	Human Health Standard Groundwater	MW-20	PW-1	PW-1	PW-1	PW-2	PW-2	PW-2	PW-2	PW-3	PW-3	PW-3	PW-3	PW-4	PW-4	PW-4	PW-4	PW-5	PW-5	PW-5	PW-6N
Sample Date			11/14/18 15:10	3/19/18 11:40	6/13/18 10:20	11/12/18 12:35	3/19/18 11:32	6/12/18 16:40	9/17/18 18:00	11/12/18 12:20	3/19/18 14:27	6/14/18 15:20	9/19/18 15:35	11/12/18 13:20	3/19/18 12:13	6/13/18 20:25	9/19/18 13:05	11/12/18 13:00	3/19/18 11:15	6/12/18 18:05	11/12/18 12:10	3/19/18 11:23
Sample ID			BBC-1811-217	BBC-1803-228	--	--	BBC-1803-229	BBC-1806-211	BBC-1809-200	--	BBC-1803-230	BBC-1806-230	BBC-1809-210	--	BBC-1803-231	BBC-1806-219	BBC-1809-207	--	BBC-1803-232	--	--	BBC-1803-233
Lab Name			Energy Labs	HYDRO	HYDRO	HYDRO	HYDRO	Energy Labs	Energy Labs	HYDRO	HYDRO	Energy Labs	Energy Labs	HYDRO	HYDRO	Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO	HYDRO	HYDRO
Remarks			--	No Sample	No Sample	No Sample	No Sample	--	--	No Sample	No Sample	--	--	No Sample	No Sample	--	--	No Sample	No Sample	No Sample	No Sample	No Sample
Lab Sample ID			H18110402-006	--	--	--	--	H18060368-012	H18090467-001	--	--	H18060368-031	H18090467-011	--	--	H18060368-020	H18090467-008	--	--	--	--	
Field Parameters																						
Depth To Water	Feet	--	22.69	102.58	100.16	101.28	57.12	52.44	54.01	54.15	14.39	12.36	13.76	13.52	53.99	50.7	53.9	53.83	352.33	346.16	335.6	NM
Dissolved Oxygen	mg/L	--	8.96	--	--	--	--	0.05	0.07	--	--	0.04	0.07	--	--	3.79	2.51	--	--	--	--	
EH	Millivolts	--	244.47	--	--	--	--	118.44	92.29	--	--	61.44	96.83	--	--	138.86	161.87	--	--	--	--	
Field pH	s.u.	--	7.74	--	--	--	--	7.35	7.48	--	--	7.3	7.37	--	--	7.1	7.06	--	--	--	--	
Field Specific Conductivity	umhos/cm	--	401	--	--	--	--	543	556	--	--	782	788	--	--	656	665	--	--	--	--	
Water Temperature	Deg C	--	7.8	--	--	--	--	8.6	8.3	--	--	7.4	6.9	--	--	9.44	7.8	--	--	--	--	
Physical Parameters																						
Total Dissolved Solids	mg/L	--	215	--	--	--	--	306	319	--	--	492	480	--	--	441	457	--	--	--	--	
Total Suspended Solids	mg/L	--	603 J	--	--	--	--	10	<10	--	--	<10	<10	--	--	12	<10	--	--	--	--	
Major Constituents - Commons Ions																						
Alkalinity as CaCO3	mg/L	--	290	--	--	--	--	240	250	--	--	270	270	--	--	170	170	--	--	--	--	
Calcium (DIS)	mg/L	--	49	--	--	--	--	60	58	--	--	90	89	--	--	75	70	--	--	--	--	
Chloride	mg/L	--	<1	--	--	--	--	1	1	--	--	1	1	--	--	1	<1	--	--	--	--	
Fluoride	mg/L	4	<0.1	--	--	--	--	0.9	0.9	--	--	0.4	0.4	--	--	0.3	0.3	--	--	--	--	
Hardness as CaCO3	mg/L	--	221	--	--	--	--	299	289	--	--	425	420	--	--	345	323	--	--	--	--	
Magnesium (DIS)	mg/L	--	24	--	--	--	--	36	35	--	--	49	48	--	--	38	36	--	--	--	--	
Potassium (DIS)	mg/L	--	1	--	--	--	--	5	5	--	--	4	4	--	--	2	2	--	--	--	--	
Sodium (DIS)	mg/L	--	1	--	--	--	--	3	3	--	--	5	5	--	--	4	4	--	--	--	--	
Sulfate	mg/L	--	10	--	--	--	--	51	54	--	--	151	151	--	--	169	172	--	--	--	--	
Nutrients																						
Nitrate + Nitrite as N	mg/L	10	0.31	--	--	--	--	<0.01	0.01	--	--	0.01	0.03	--	--	0.02	0.04	--	--	--	--	
Metals - Trace Constituents																						
Aluminum (DIS)	mg/L	--	<0.009	--	--	--	--	<0.009	<0.009	--	--	<0.009	<0.009	--	--	<0.009	<0.009	--	--	--	--	
Antimony (DIS)	mg/L	0.006	<0.0005	--	--	--	--	<0.0005	<0.0005	--	--	<0.0005	<0.0005	--	--	0.0007	<0.0005	--	--	--	--	
Arsenic (DIS)	mg/L	0.01	<0.001	--	--	--	--	0.005	0.005	--	--	0.006	0.007	--	--	0.085	0.071	--	--	--	--	
Barium (DIS)	mg/L	1	0.201	--	--	--	--	0.032	0.035	--	--	0.012	0.011	--	--	0.04	0.047	--	--	--	--	
Beryllium (DIS)	mg/L	0.004	<0.0008	--	--	--	--	<0.0008	<0.0008	--	--	<0.0008	<0.0008	--	--	<0.0008	<0.0008	--	--	--	--	
Cadmium (DIS)	mg/L	0.005	<0.00003	--	--	--	--	<0.00003	<0.00003	--	--	<0.00003	<0.00003	--	--	<0.00003	<0.00003	--	--	--	--	
Chromium (DIS)	mg/L	0.1	<0.01	--	--	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	--	--	
Cobalt (DIS)	mg/L	--	<0.01	--	--	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	--	--	
Copper (DIS)	mg/L	1.3	<0.002	--	--	--	--	<0.002	<0.002	--	--	<0.002	<0.002	--	--	<0.002	<0.002	--	--	--	--	
Iron (DIS)	mg/L	--	<0.02	--	--	--	--	2.99	3.09	--	--	6.35	5.9	--	--	9.69	10.3	--	--	--	--	
Lead (DIS)	mg/L	0.015	<0.0003	--	--	--	--	<0.0003	<0.0003	--	--	<0.0003	<0.0003	--	--	<0.0003	<0.0003	--	--	--	--	
Manganese (DIS)	mg/L	--	<0.005	--	--	--	--	0.066	0.062	--	--	0.05	0.049	--	--	0.132	0.149	--	--	--	--	
Mercury (DIS)	mg/L	0.002	<0.000005	--	--	--	--	<0.000005	<0.000005	--	--	<0.000005	<0.000005	--	--	<0.000005	<0.000005	--	--	--	--	
Molybdenum (DIS)	mg/L	--	<0.002	--	--	--	--	<0.002	<0.002	--	--	<0.002	<0.002	--	--	<0.002	<0.002	--	--	--	--	
Nickel (DIS)	mg/L	0.1	0.001	--	--	--	--	<0.001	<0.001	--	--	<0.001	<0.001	--	--	0.006	0.005	--	--	--	--	
Selenium (DIS)	mg/L	0.05	0.0002	--	--	--	--	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	--	--	
Silver (DIS)	mg/L	0.1	<0.0002	--	--	--	--	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	--	--	
Strontium (DIS)	mg/L	4	0.0738	--	--	--	--	0.0844	0.0848	--	--	0.336	0.344	--	--	10.4	9.93	--	--	--	--	
Thallium (DIS)	mg/L	0.002	<0.0002	--	--	--	--	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	0.0005	0.0005	--	--	--	--	
Uranium (DIS)	mg/L	0.03	0.0005	--	--	--	--	<0.008	<0.008	--	--	<0.008	<0.008	--	--	<0.008	<0.008	--	--	--	--	
Zinc (DIS)	mg/L	2	<0.002	--	--	--	--	<0.002	<0.002	--	--	0.004	<0.002	--	--	0.008	0.006	--	--	--	--	

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:
Human Health Standard Groundwater

Station Name	Reporting Units	Human Health Standard Groundwater	PW-6N	PW-6N	PW-7	PW-7	PW-7	PW-8	PW-8	PW-8	PW-8	PW-9	PW-9	PW-9	PW-9	PW-10	PW-10	PW-10	PW-10	SC12-116	SC12-116	SC12-116
Sample Date			6/12/18 17:50	11/12/18 12:15	6/27/18 12:20	10/3/18 14:30	11/12/18 00:00	3/19/18 12:11	6/13/18 17:05	9/18/18 18:00	11/12/18 12:58	3/19/18 12:02	6/13/18 14:45	9/18/18 15:55	11/12/18 12:31	3/19/18 11:58	6/13/18 11:10	9/18/18 13:05	11/12/18 12:30	3/19/18 12:39	6/12/18 16:04	11/12/18 15:00
Sample ID			--	--	BBC-1806-234	BBC-1810-200	--	BBC-1803-234	BBC-1806-218	BBC-1809-205	--	BBC-1803-235	BBC-1806-214	BBC-1809-204	--	BBC-1803-236	BBC-1806-212	BBC-1809-203	--	BBC-1803-251	--	--
Lab Name			HYDRO	HYDRO	HYDRO	Energy Labs	HYDRO	HYDRO	Energy Labs	Energy Labs	HYDRO	HYDRO	Energy Labs	Energy Labs	HYDRO	HYDRO	Energy Labs	Energy Labs	HYDRO	HYDRO	HYDRO	HYDRO
Remarks			No Sample	No Sample	No Sample	--	No Sample	No Sample	--	--	No Sample	No Sample	--	--	No Sample	No Sample	--	--	No Sample	No Sample	No Sample	No Sample
Lab Sample ID			--	--	--	H18100162-001	--	--	H18060368-019	H18090467-006	--	--	H18060368-015	H18090467-005	--	--	H18060368-013	H18090467-004	--	--	--	--
Field Parameters																						
Depth To Water	Feet	--	306.38	307.47	NM	NM	NM	46.55	41.34	45.64	45.86	46.87	43.12	45.66	47.43	47.03	43.21	45.48	45.43	NM	102.47	102.28
Dissolved Oxygen	mg/L	--	--	--	--	0.01	--	--	0.05	0.23	--	--	0.05	0.1	--	--	0.86	0.54	--	--	--	--
EH	Millivolts	--	--	--	--	-323.00	--	--	184.54	165.11	--	--	180.17	157.95	--	--	175.88	156.33	--	--	--	--
Field pH	s.u.	--	--	--	--	9.16	--	--	7.21	7.28	--	--	7.06	7.23	--	--	7.35	7.41	--	--	--	--
Field Specific Conductivity	umhos/cm	--	--	--	--	530	--	--	555	536	--	--	839	834	--	--	765	770	--	--	--	--
Water Temperature	Deg C	--	--	--	--	11.7	--	--	8.6	8.2	--	--	9.6	9.1	--	--	10.1	9.8	--	--	--	--
Physical Parameters																						
Total Dissolved Solids	mg/L	--	--	--	--	312	--	--	346	346	--	--	587	598	--	--	527	544	--	--	--	--
Total Suspended Solids	mg/L	--	--	--	--	<10	--	--	<10	<10	--	--	<10	<10	--	--	<10	<10	--	--	--	--
Major Constituents - Commons Ions																						
Alkalinity as CaCO3	mg/L	--	--	--	--	280	--	--	190	190	--	--	210	210	--	--	220	220	--	--	--	--
Calcium (DIS)	mg/L	--	--	--	--	7	--	--	68	63	--	--	89	83	--	--	80	76	--	--	--	--
Chloride	mg/L	--	--	--	--	4	--	--	<1	<1	--	--	1	1	--	--	<1	<1	--	--	--	--
Fluoride	mg/L	4	--	--	--	1.6	--	--	0.4	0.4	--	--	0.7	0.7	--	--	0.9	0.9	--	--	--	--
Hardness as CaCO3	mg/L	--	--	--	--	77	--	--	307	287	--	--	459	428	--	--	414	390	--	--	--	--
Magnesium (DIS)	mg/L	--	--	--	--	14	--	--	34	31	--	--	57	53	--	--	52	48	--	--	--	--
Potassium (DIS)	mg/L	--	--	--	--	8	--	--	2	2	--	--	3	3	--	--	5	5	--	--	--	--
Sodium (DIS)	mg/L	--	--	--	--	99	--	--	3	3	--	--	13	13	--	--	11	11	--	--	--	--
Sulfate	mg/L	--	--	--	--	11	--	--	102	98	--	--	246	246	--	--	199	203	--	--	--	--
Nutrients																						
Nitrate + Nitrite as N	mg/L	10	--	--	--	<0.01	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	--	--
Metals - Trace Constituents																						
Aluminum (DIS)	mg/L	--	--	--	--	<0.009	--	--	<0.009	<0.009	--	--	<0.009	<0.009	--	--	<0.009	<0.009	--	--	--	--
Antimony (DIS)	mg/L	0.006	--	--	--	<0.0005	--	--	0.001	0.0009	--	--	<0.0005	<0.0005	--	--	<0.0005	<0.0005	--	--	--	--
Arsenic (DIS)	mg/L	0.01	--	--	--	<0.001	--	--	0.014	0.013	--	--	0.085	0.087	--	--	0.065	0.063	--	--	--	--
Barium (DIS)	mg/L	1	--	--	--	0.153	--	--	0.036	0.035	--	--	0.012	0.011	--	--	0.045	0.038	--	--	--	--
Beryllium (DIS)	mg/L	0.004	--	--	--	<0.0008	--	--	<0.0008	<0.0008	--	--	<0.0008	<0.0008	--	--	<0.0008	<0.0008	--	--	--	--
Cadmium (DIS)	mg/L	0.005	--	--	--	<0.00003	--	--	<0.00003	<0.00003	--	--	<0.00003	<0.00003	--	--	<0.00003	<0.00003	--	--	--	--
Chromium (DIS)	mg/L	0.1	--	--	--	<0.01	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	--	--
Cobalt (DIS)	mg/L	--	--	--	--	<0.01	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	<0.01	<0.01	--	--	--	--
Copper (DIS)	mg/L	1.3	--	--	--	<0.002	--	--	<0.002	<0.002	--	--	<0.002	<0.002	--	--	<0.002	<0.002	--	--	--	--
Iron (DIS)	mg/L	--	--	--	--	0.46	--	--	0.89	0.86	--	--	2.26	2.18	--	--	0.42	0.41	--	--	--	--
Lead (DIS)	mg/L	0.015	--	--	--	0.0007	--	--	0.0084	0.0082	--	--	<0.0003	<0.0003	--	--	<0.0003	<0.0003	--	--	--	--
Manganese (DIS)	mg/L	--	--	--	--	0.045	--	--	0.099	0.096	--	--	0.036	0.028	--	--	0.196	0.149	--	--	--	--
Mercury (DIS)	mg/L	0.002	--	--	--	<0.000005	--	--	<0.000005	<0.000005	--	--	<0.000005	<0.000005	--	--	<0.000005	<0.000005	--	--	--	--
Molybdenum (DIS)	mg/L	--	--	--	--	0.003	--	--	<0.002	<0.002	--	--	<0.002	<0.002	--	--	<0.002	<0.002	--	--	--	--
Nickel (DIS)	mg/L	0.1	--	--	--	<0.001	--	--	<0.001	<0.001	--	--	<0.001	<0.001	--	--	<0.001	<0.001	--	--	--	--
Selenium (DIS)	mg/L	0.05	--	--	--	<0.0002	--	--	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	--	--
Silver (DIS)	mg/L	0.1	--	--	--	<0.0002	--	--	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	<0.0002	<0.0002	--	--	--	--
Strontium (DIS)	mg/L	4	--	--	--	0.227	--	--	0.801	0.715	--	--	9.44	9.03	--	--	13.1	12.8	--	--	--	--
Thallium (DIS)	mg/L	0.002	--	--	--	<0.0002	--	--	0.0028	0.0026	--	--	0.001	0.0009	--	--	<0.0002	<0.0002	--	--	--	--
Uranium (DIS)	mg/L	0.03	--	--	--	<0.008	--	--	<0.008	<0.008	--	--	<0.008	<0.008	--	--	<0.008	<0.008	--	--	--	--
Zinc (DIS)	mg/L	2	--	--	--	0.077	--	--	<0.002	<0.002	--	--	<0.002	<0.002	--	--	0.002	0.003	--	--	--	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:
Human Health Standard Groundwater

Station Name	Reporting Units	Human Health Standard Groundwater	SC15-184	SC15-184	SC15-184	SC15-184	SC15-184	SC15-185	SC15-185	SC15-185	SC15-185	SC15-185	SC15-185	SC15-185	SC15-194	SC15-194	SC15-194	SC15-194	SC15-194	SC15-194	SC15-198	SC15-198
Sample Date			3/21/18 09:45	6/13/18 16:05	9/20/18 09:20	11/12/18 14:20	11/14/18 17:20	3/22/18 12:00	6/12/18 15:18	6/13/18 15:20	9/26/18 12:20	11/12/18 14:08	11/15/18 16:45	3/22/18 13:20	6/12/18 16:15	6/13/18 13:25	9/26/18 17:00	11/12/18 13:28	11/16/18 10:20	3/22/18 10:35	6/12/18 14:50	
Sample ID			BBC-1803-215	BBC-1806-220	BBC-1809-214	--	BBC-1811-220	BBC-1803-225	--	BBC-1806-217	BBC-1809-215	--	BBC-1811-226	BBC-1803-226	--	BBC-1806-215	BBC-1809-216	--	BBC-1811-228	BBC-1803-224	--	
Lab Name			HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	Energy Labs	Energy Labs	HYDRO	
Remarks			No Sample	--	--	No Sample	--	--	No Sample	--	--	No Sample	--	--	No Sample	--	--	No Sample	--	--	--	No Sample
Lab Sample ID		--	H18060368-021	H18090538-001	--	H18110402-009	H18030348-025	--	H18060368-018	H18090666-001	--	H18110402-015	H18030348-026	--	H18060368-016	H18090666-002	--	H18110402-017	H18030348-024	--		
Field Parameters																						
Depth To Water	Feet	--	--	NM	Artesian	NM	FLOWING	37.21	23.28	23.4	29.62	31.08	30.94	21.82	17.62	17.69	19.6	19.77	19.86	45.96	32.86	
Dissolved Oxygen	mg/L	--	--	4.58	7.1	--	6.35	2.84	--	3.97	4.89	--	5.13	0.81	--	1.65	0.83	--	0.7	6.66	--	
EH	Millivolts	--	--	386.41	317.20	--	247.81	364.50	--	411.61	309.23	--	250.48	106.14	--	227.16	200.02	--	173.63	391.70	--	
Field pH	s.u.	--	--	7.85	7.82	--	7.96	7.75	--	7.85	7.33	--	7.92	7.77	--	7.67	7.43	--	7.77	7.39	--	
Field Specific Conductivity	umhos/cm	--	--	367	361	--	365	3.92	--	392	394	--	398	382	--	385	380	--	385	417	--	
Water Temperature	Deg C	--	--	5.8	6.5	--	5.8	5.3	--	11.1	7.5	--	4.8	6.8	--	17.9	9.9	--	5.1	5.9	--	
Physical Parameters																						
Total Dissolved Solids	mg/L	--	--	201	194	--	197	219	--	219	215	--	215	214	--	215	210	--	213	228	--	
Total Suspended Solids	mg/L	--	--	<10	<10	--	<10	<10	--	<10	<10	--	<10	<10	--	<10	<10	--	<10	<10	--	
Major Constituents - Commons Ions																						
Alkalinity as CaCO3	mg/L	--	--	180	190	--	190	200	--	200	210	--	210	180	--	170	180	--	180	220	--	
Calcium (DIS)	mg/L	--	--	40	36	--	38	48	--	49	44	--	46	44	--	45	37	--	42	51	--	
Chloride	mg/L	--	--	<1	<1	--	<1	<1	--	<1	<1	--	<1	<1	--	<1	<1	--	<1	2	--	
Fluoride	mg/L	4	--	0.2	0.2	--	0.2	0.1	--	0.1	0.1	--	0.1	0.3	--	0.4	0.3	--	0.3	0.1	--	
Hardness as CaCO3	mg/L	--	--	213	192	--	203	213	--	219	206	--	209	213	--	218	193	--	207	234	--	
Magnesium (DIS)	mg/L	--	--	27	25	--	26	23	--	23	23	--	23	25	--	26	25	--	25	26	--	
Potassium (DIS)	mg/L	--	--	<1	<1	--	<1	2	--	2	2	--	2	<1	--	<1	<1	--	<1	<1	--	
Sodium (DIS)	mg/L	--	--	2	2	--	2	5	--	4	4	--	4	3	--	2	2	--	2	3	--	
Sulfate	mg/L	--	--	14	16	--	16	11	--	10	11	--	12	31	--	30	32	--	33	7	--	
Nutrients																						
Nitrate + Nitrite as N	mg/L	10	--	0.27	0.3	--	0.24	0.32	--	0.27	0.24	--	0.28	<0.01	--	<0.01	<0.01	--	<0.01	0.6	--	
Metals - Trace Constituents																						
Aluminum (DIS)	mg/L	--	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	--	<0.009	<0.009	--	
Antimony (DIS)	mg/L	0.006	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	--	
Arsenic (DIS)	mg/L	0.01	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	
Barium (DIS)	mg/L	1	--	0.086	0.089	--	0.091	0.078	--	0.07	0.069	--	0.07	0.037	--	0.032	0.032	--	0.034	0.421	--	
Beryllium (DIS)	mg/L	0.004	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	--	
Cadmium (DIS)	mg/L	0.005	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	--	
Chromium (DIS)	mg/L	0.1	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	
Cobalt (DIS)	mg/L	--	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	--	
Copper (DIS)	mg/L	1.3	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	
Iron (DIS)	mg/L	--	--	<0.02	0.04	--	<0.02	<0.02	--	<0.02	<0.02	--	<0.02	0.07	--	<0.02	0.03	--	0.04	<0.02	--	
Lead (DIS)	mg/L	0.015	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	--	
Manganese (DIS)	mg/L	--	--	<0.005	<0.005	--	<0.005	<0.005	--	<0.005	<0.005	--	<0.005	0.006 J	--	<0.005	<0.005	--	<0.005	<0.005	--	
Mercury (DIS)	mg/L	0.002	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	<0.000005	<0.000005	--	
Molybdenum (DIS)	mg/L	--	--	<0.002	<0.002	--	<0.002	0.004	--	0.003	0.003	--	0.004	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	--	
Nickel (DIS)	mg/L	0.1	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	--	
Selenium (DIS)	mg/L	0.05	--	0.0011	0.0012	--	0.0013	<0.0002	--	<0.0002	0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	0.0003	--	
Silver (DIS)	mg/L	0.1	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	
Strontium (DIS)	mg/L	4	--	0.116	0.119	--	0.121	0.262	--	0.236	0.25	--	0.24	0.0759	--	0.0675	0.0689	--	0.0703	0.102	--	
Thallium (DIS)	mg/L	0.002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	--	
Uranium (DIS)	mg/L	0.03	--	<0.008	<0.008	--	0.001	<0.008	--	<0.008	<0.008	--	0.003	<0.008	--	<0.008	<0.008	--	0.0009	<0.008	--	
Zinc (DIS)	mg/L	2	--	0.003	0.003	--	<0.002	0.002 J	--	0.004	0.003	--	<0.002	<0.002	--	<0.002	<0.002	--	<0.002	0.004 J	--	

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

Analyte concentration exceeds the standard for:
Human Health Standard Groundwater

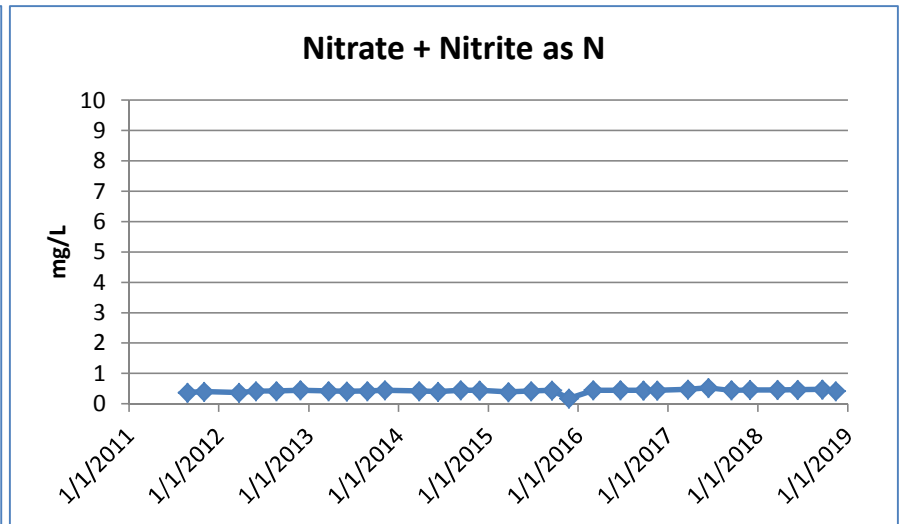
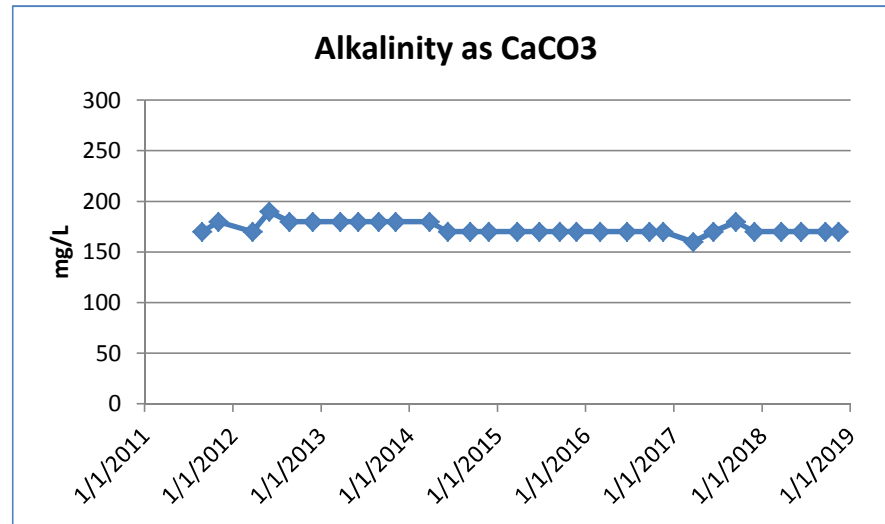
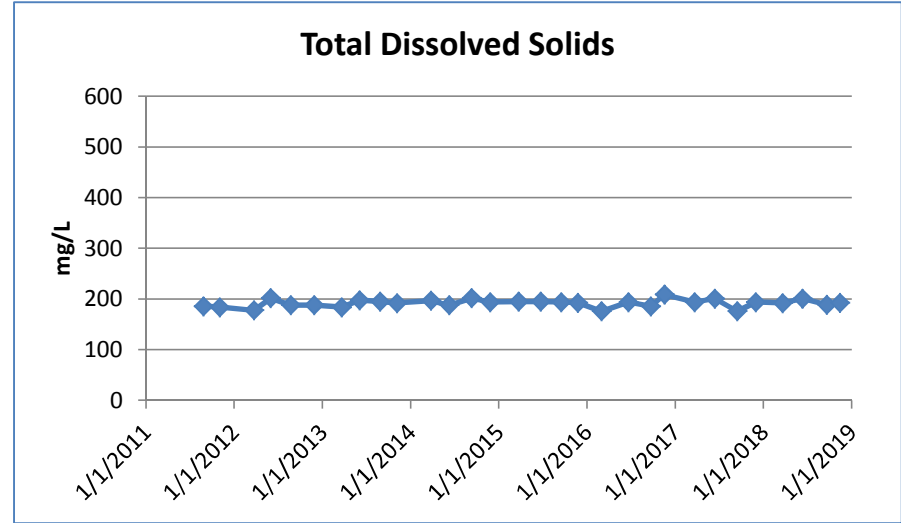
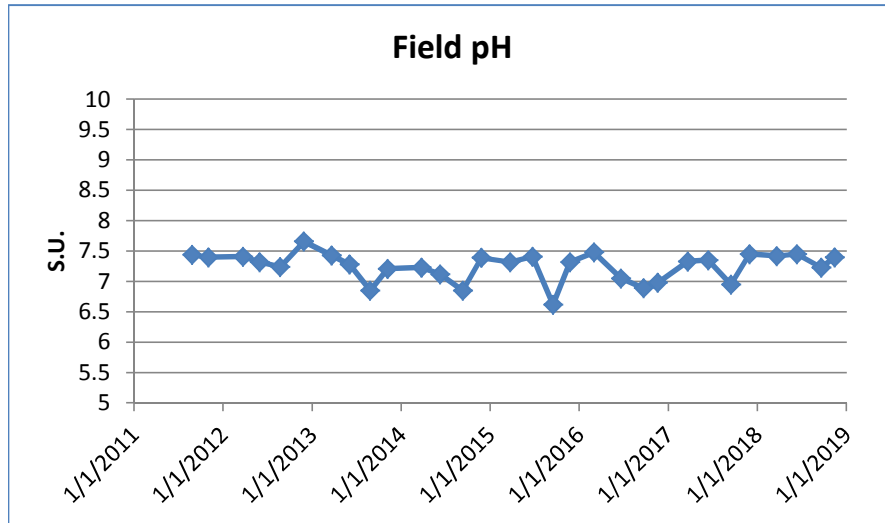
Station Name	Reporting Units	Human Health Standard Groundwater	SC15-198	SC15-198	SC15-198	SC15-198
Sample Date			6/13/18 14:25	9/26/18 14:55	11/12/18 13:48	11/16/18 09:05
Sample ID			BBC-1806-216	BBC-1809-217	--	BBC-1811-227
Lab Name			Energy Labs	Energy Labs	HYDRO	Energy Labs
Remarks			--	--	No Sample	--
Lab Sample ID			H18060368-017	H18090666-003	--	H18110402-016
Field Parameters						
Depth To Water	Feet	--	33	39.95	41.88	41.7
Dissolved Oxygen	mg/L	--	4.76	6.05	--	9.22
EH	Millivolts	--	355.43	283.19	--	276.92
Field pH	s.u.	--	7.7	7.5	--	7.68
Field Specific Conductivity	umhos/cm	--	426	427	--	430
Water Temperature	Deg C	--	17.5	17.1	--	3.4
Physical Parameters						
Total Dissolved Solids	mg/L	--	234	233	--	225
Total Suspended Solids	mg/L	--	<10	<10	--	<10
Major Constituents - Commons Ions						
Alkalinity as CaCO3	mg/L	--	220	220	--	230
Calcium (DIS)	mg/L	--	51	47	--	50
Chloride	mg/L	--	2	2	--	2
Fluoride	mg/L	4	0.1	0.1	--	0.1
Hardness as CaCO3	mg/L	--	248	228	--	234
Magnesium (DIS)	mg/L	--	29	27	--	27
Potassium (DIS)	mg/L	--	<1	<1	--	<1
Sodium (DIS)	mg/L	--	3	4	--	4
Sulfate	mg/L	--	8	7	--	7
Nutrients						
Nitrate + Nitrite as N	mg/L	10	0.58	0.7	--	0.72
Metals - Trace Constituents						
Aluminum (DIS)	mg/L	--	<0.009	<0.009	--	<0.009
Antimony (DIS)	mg/L	0.006	<0.0005	<0.0005	--	<0.0005
Arsenic (DIS)	mg/L	0.01	<0.001	<0.001	--	<0.001
Barium (DIS)	mg/L	1	0.27	0.365	--	0.404
Beryllium (DIS)	mg/L	0.004	<0.0008	<0.0008	--	<0.0008
Cadmium (DIS)	mg/L	0.005	<0.00003	<0.00003	--	<0.00003
Chromium (DIS)	mg/L	0.1	<0.01	<0.01	--	<0.01
Cobalt (DIS)	mg/L	--	<0.01	<0.01	--	<0.01
Copper (DIS)	mg/L	1.3	<0.002	<0.002	--	<0.002
Iron (DIS)	mg/L	--	<0.02	<0.02	--	<0.02
Lead (DIS)	mg/L	0.015	<0.0003	<0.0003	--	<0.0003
Manganese (DIS)	mg/L	--	<0.005	<0.005	--	<0.005
Mercury (DIS)	mg/L	0.002	<0.000005	<0.000005	--	<0.000005
Molybdenum (DIS)	mg/L	--	<0.002	<0.002	--	<0.002
Nickel (DIS)	mg/L	0.1	<0.001	<0.001	--	<0.001
Selenium (DIS)	mg/L	0.05	0.0004	0.0002	--	0.0002
Silver (DIS)	mg/L	0.1	<0.0002	<0.0002	--	<0.0002
Strontium (DIS)	mg/L	4	0.103	0.0963	--	0.101
Thallium (DIS)	mg/L	0.002	<0.0002	<0.0002	--	<0.0002
Uranium (DIS)	mg/L	0.03	<0.008	<0.008	--	0.0007
Zinc (DIS)	mg/L	2	0.002	0.003	--	<0.002

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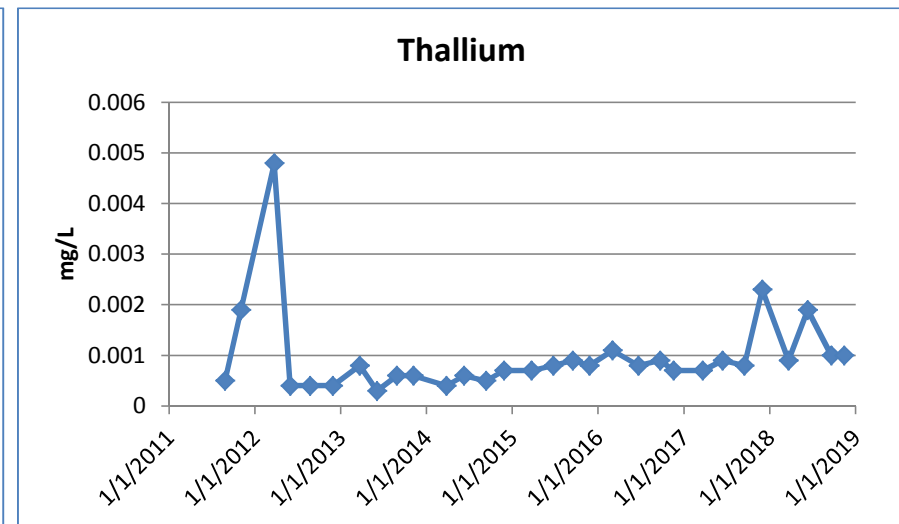
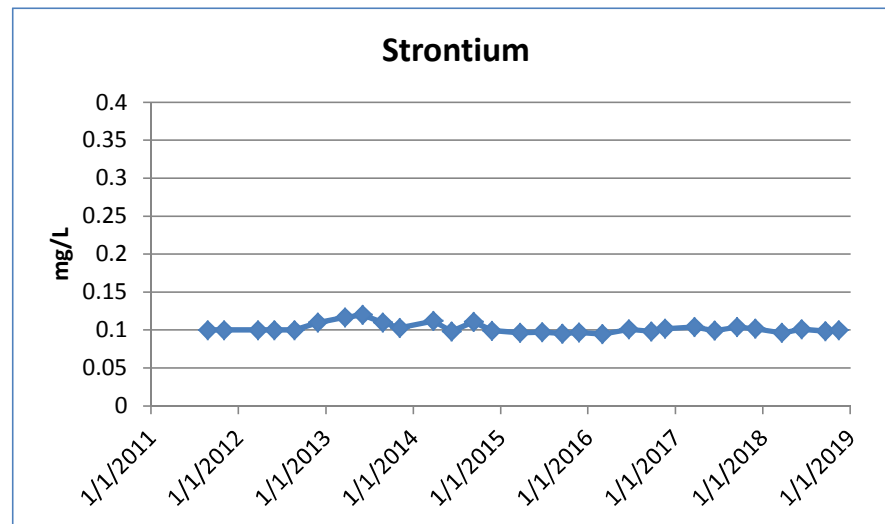
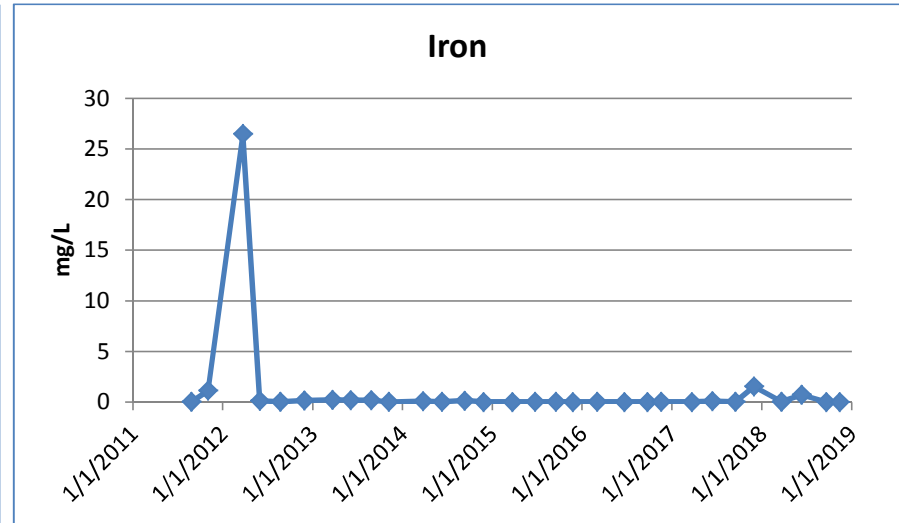
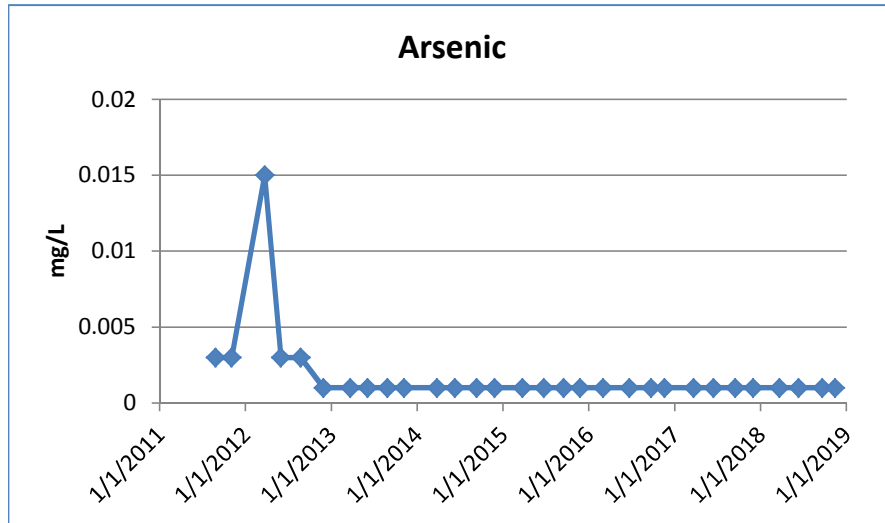
Analyte concentration exceeds the standard for:

	Human Health Standard Groundwater
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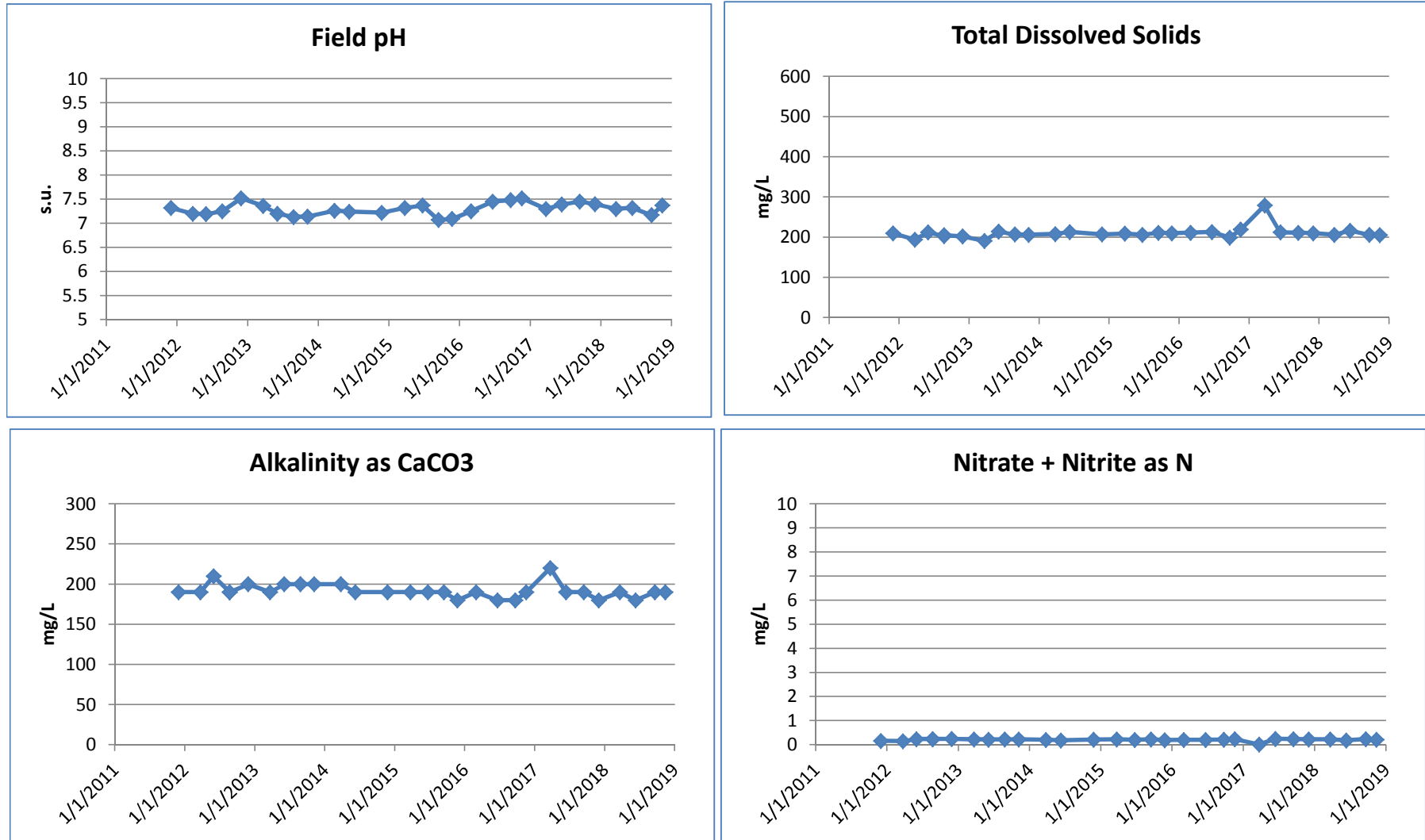
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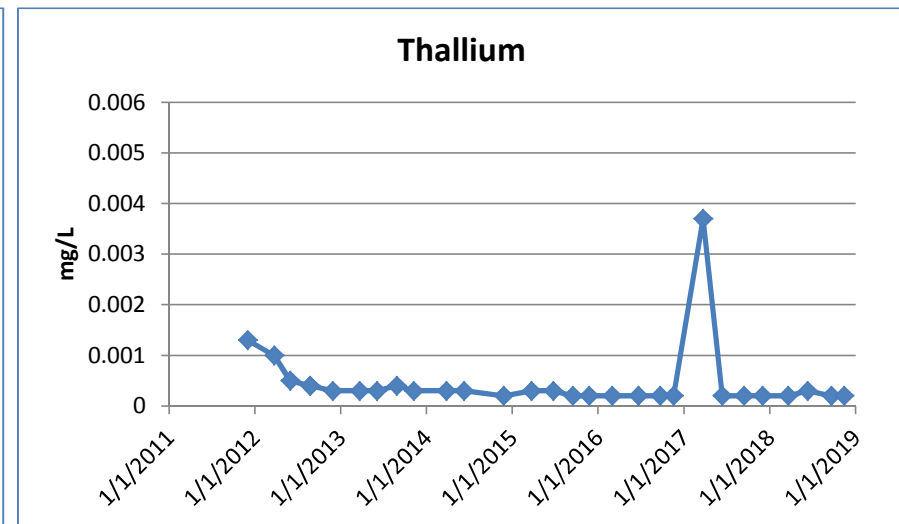
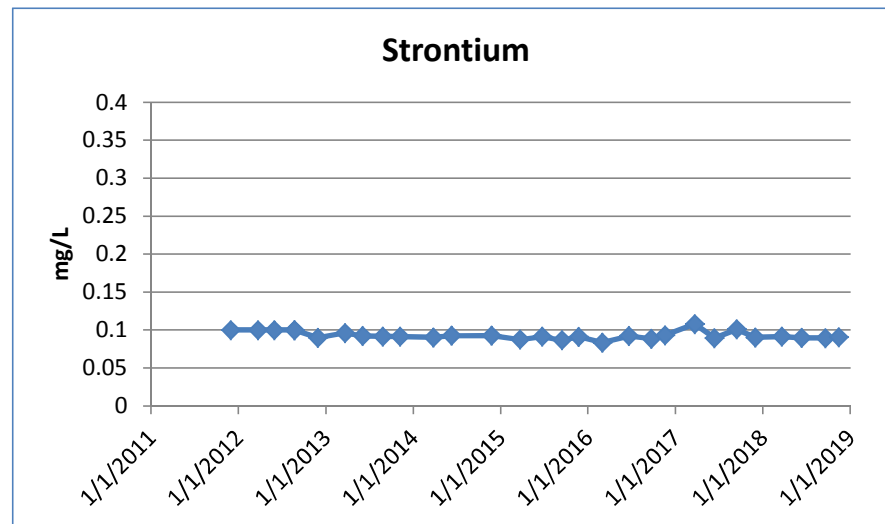
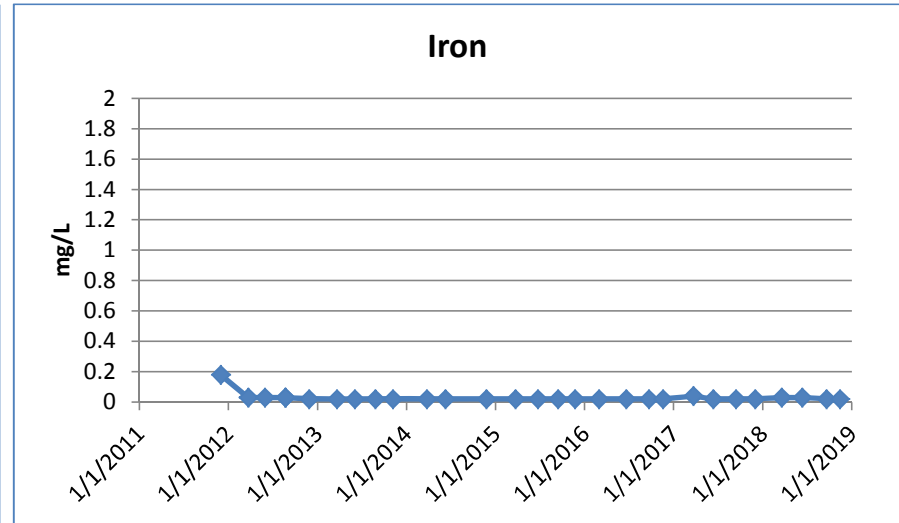
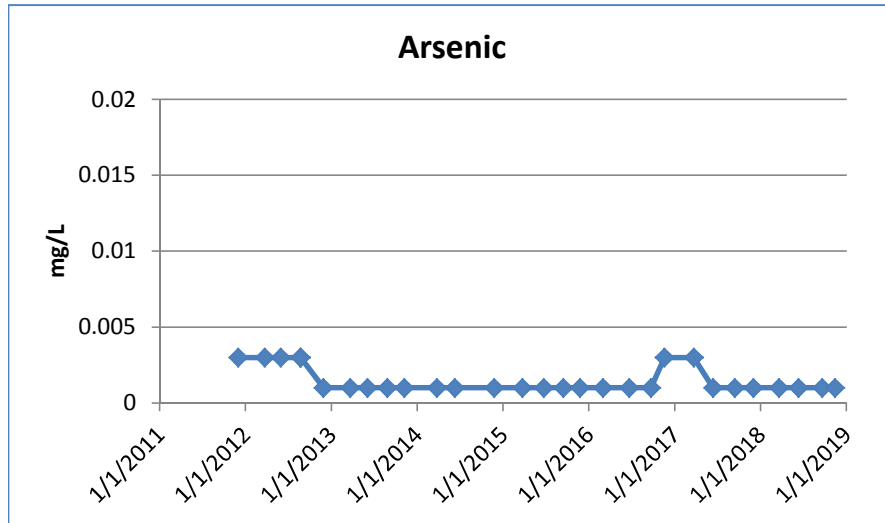
MW-1A



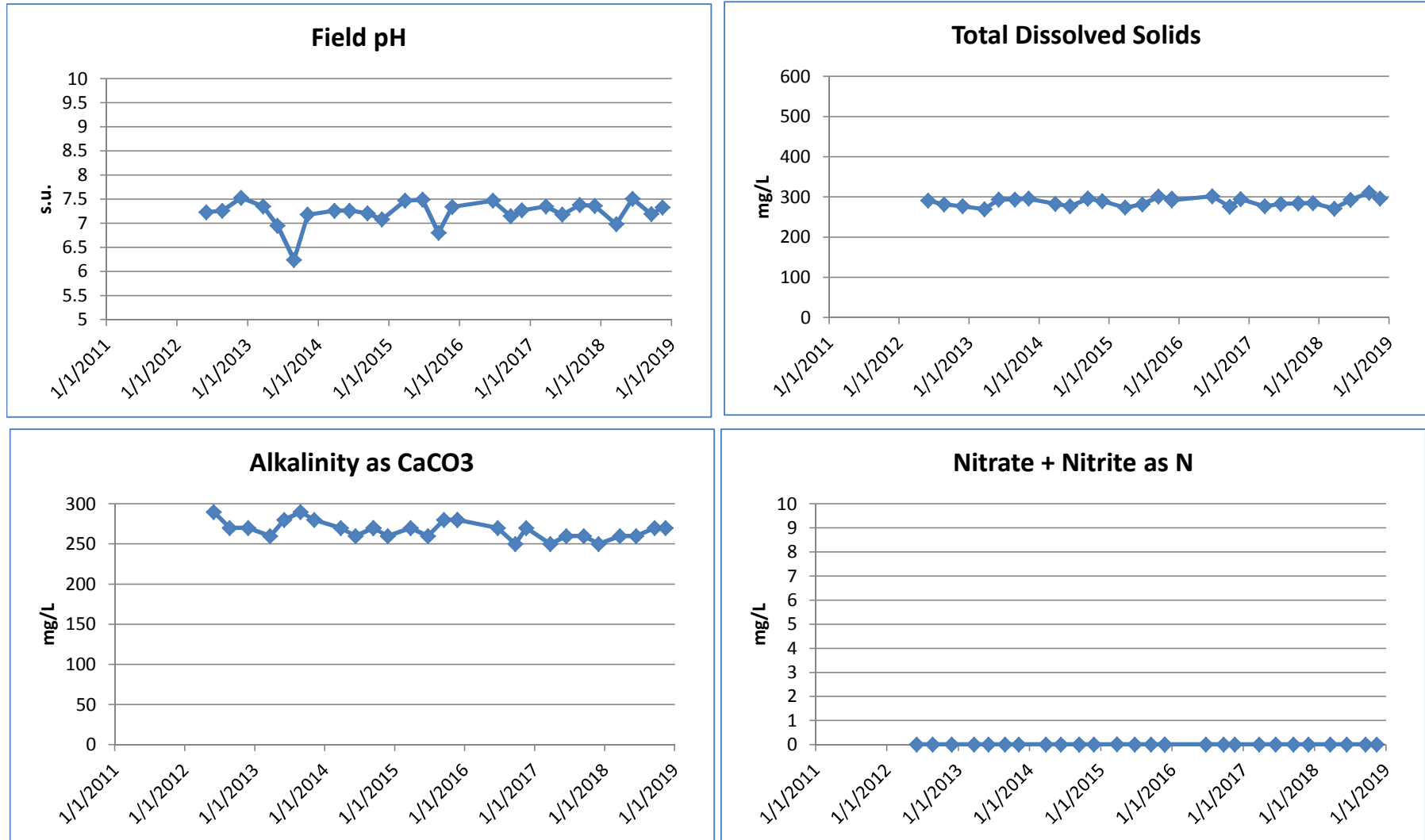
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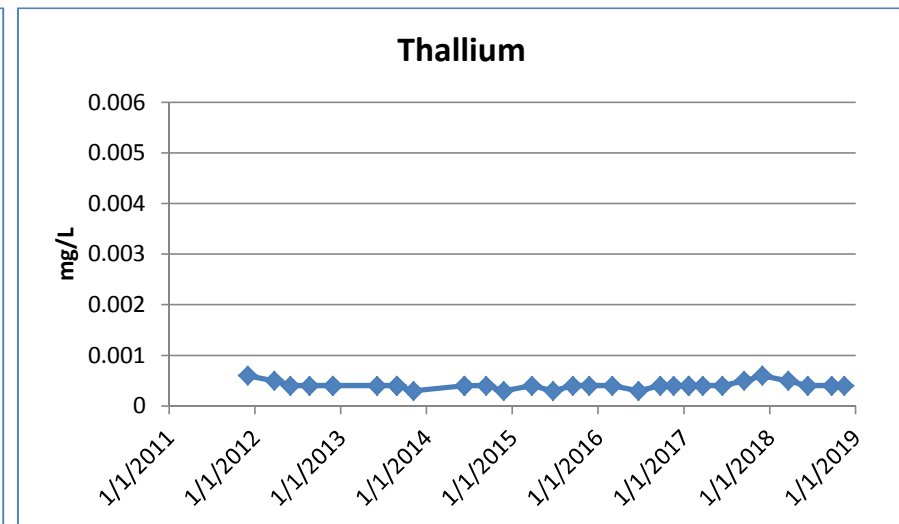
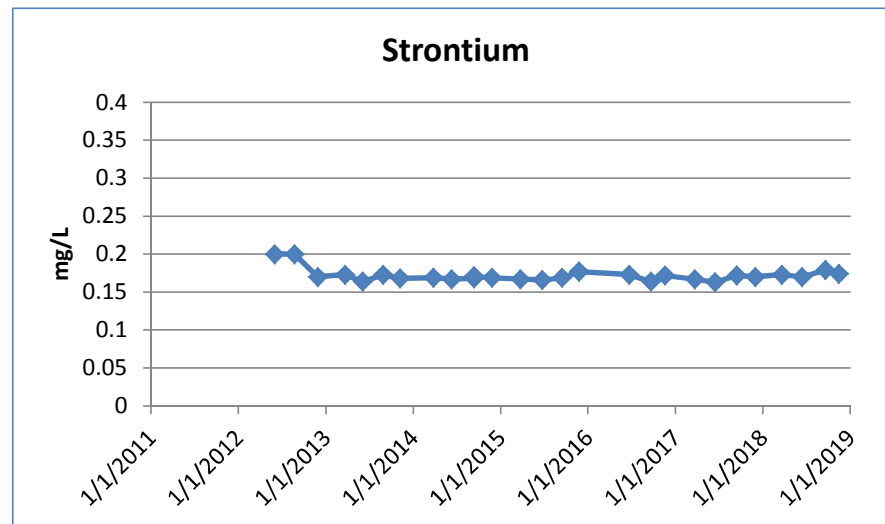
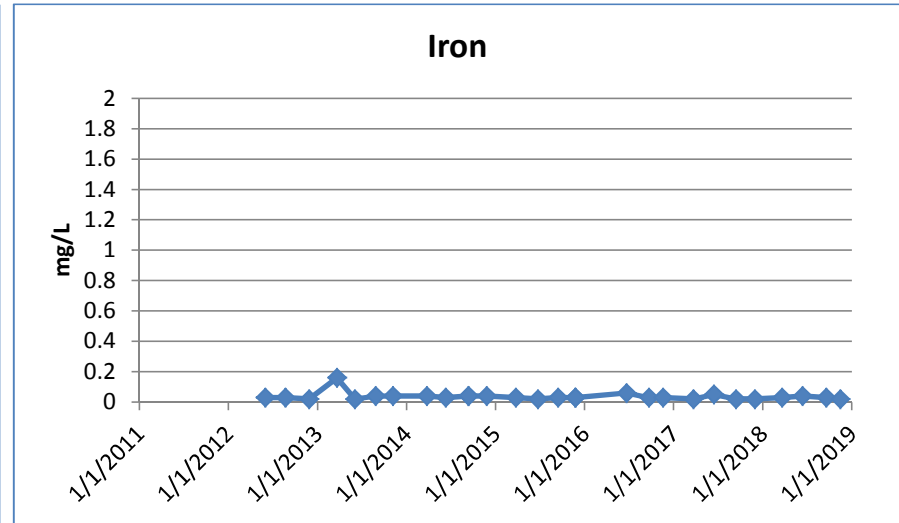
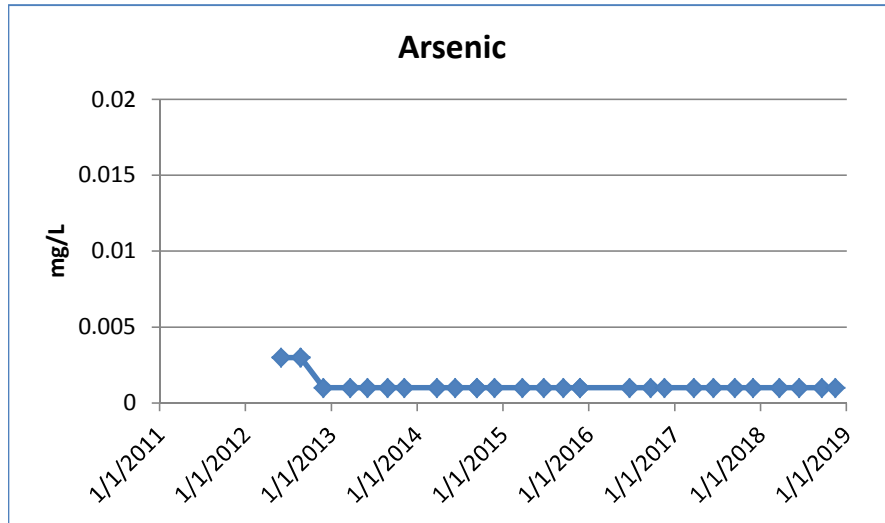
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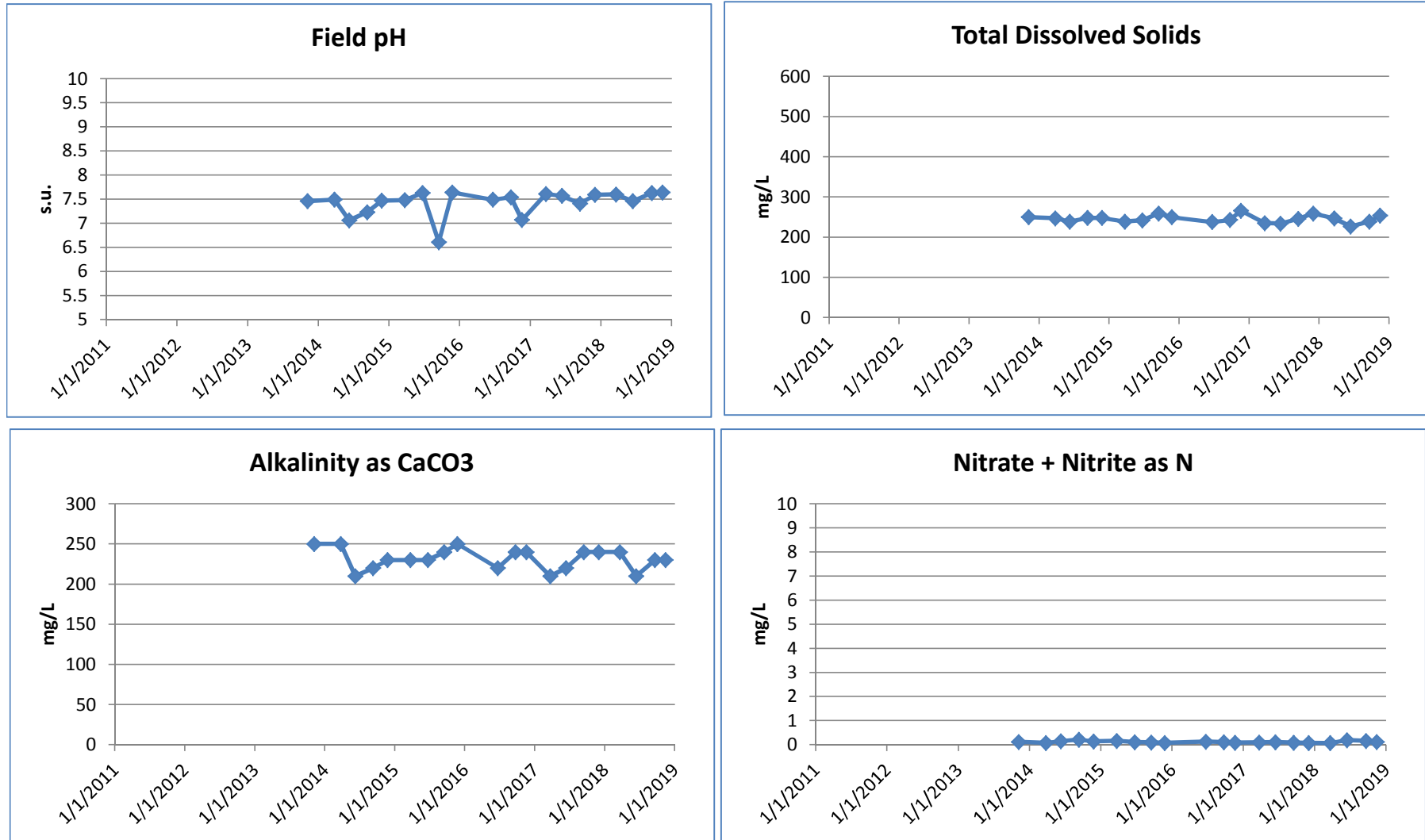
MW-4A



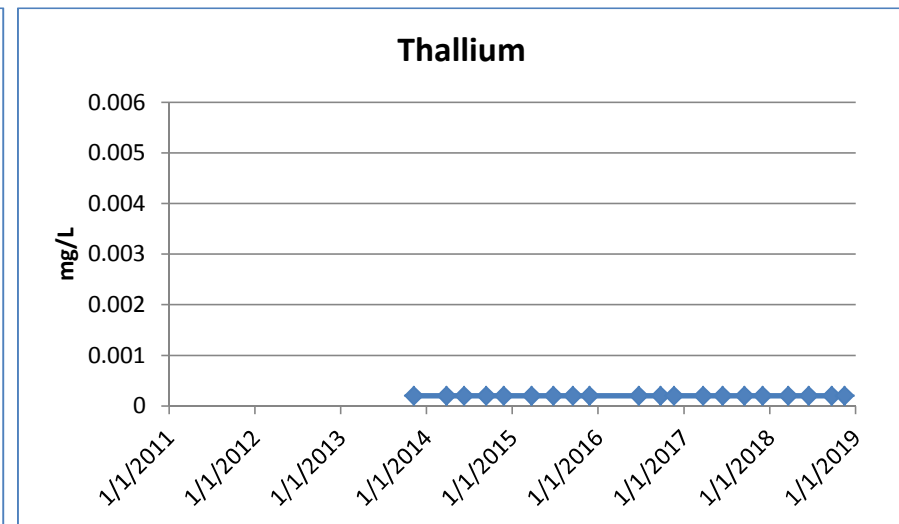
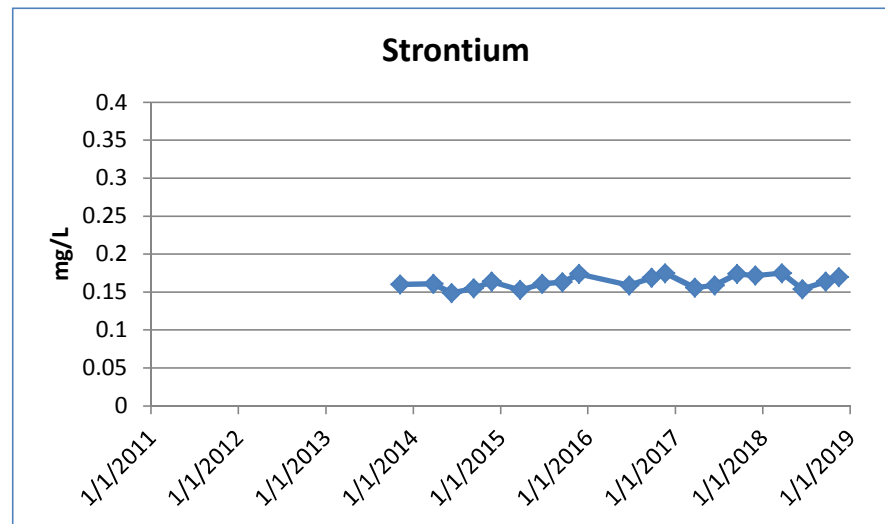
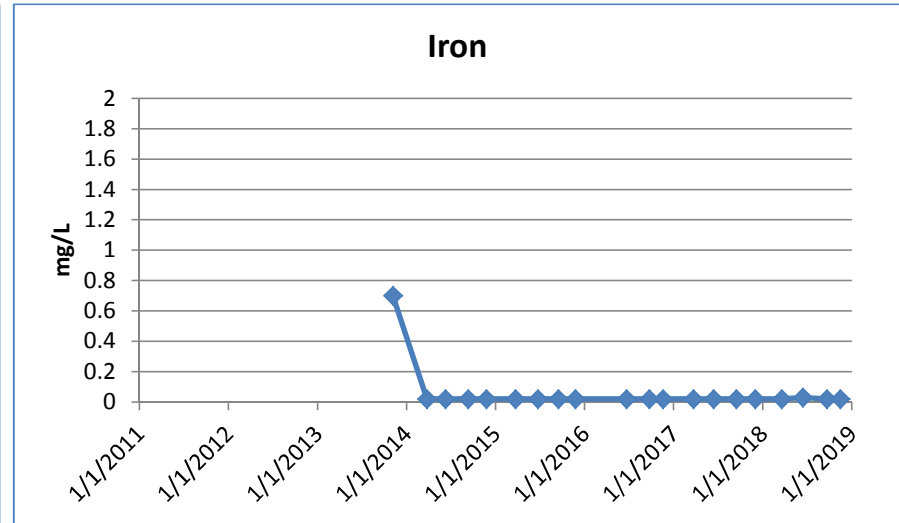
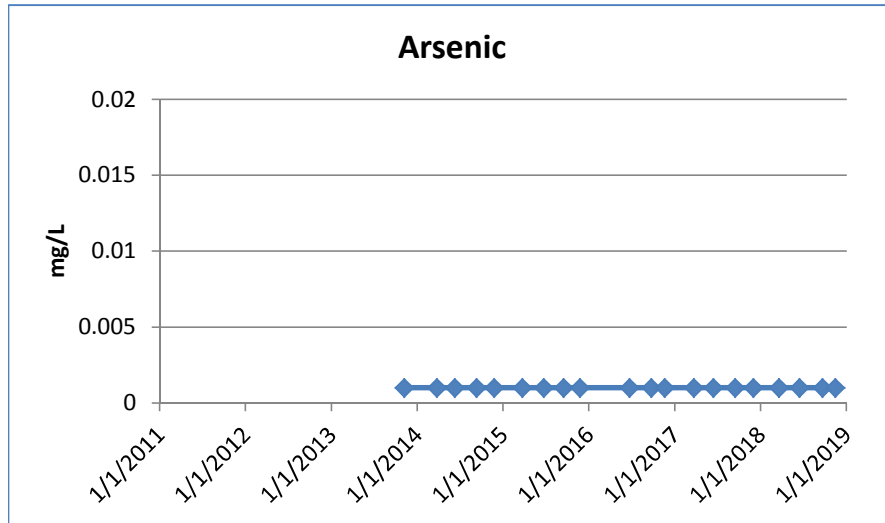
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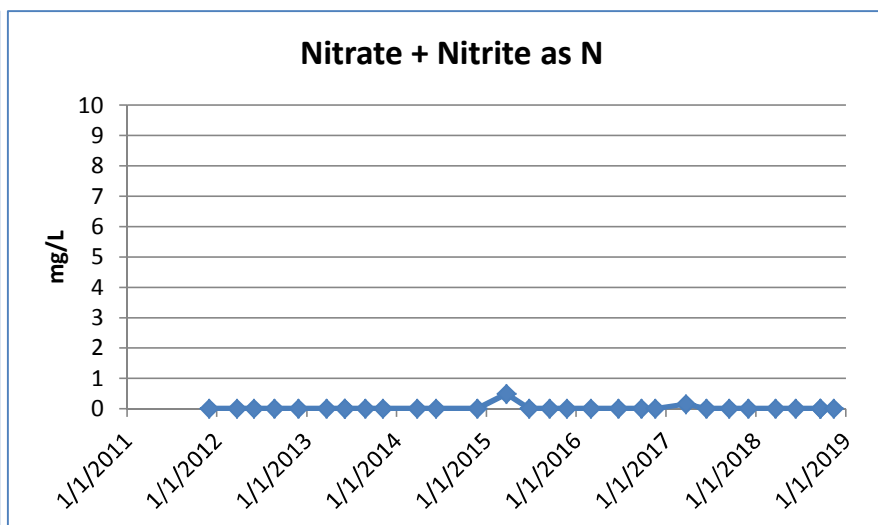
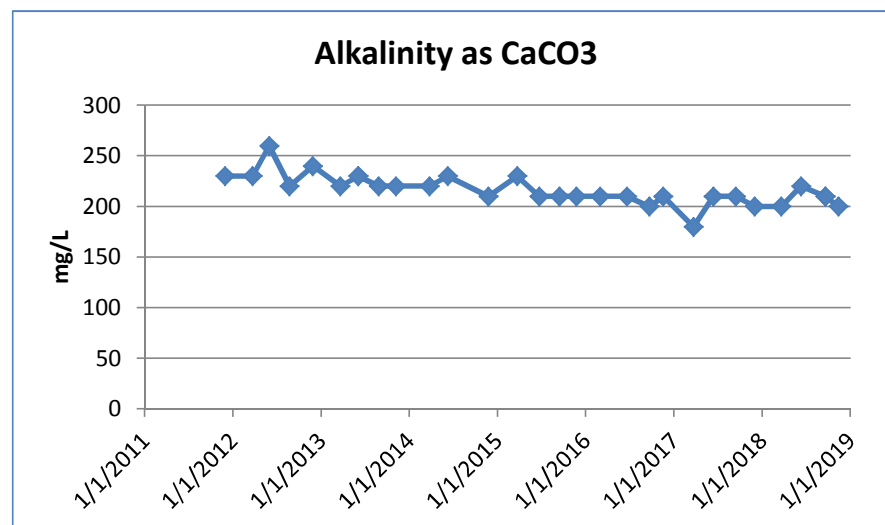
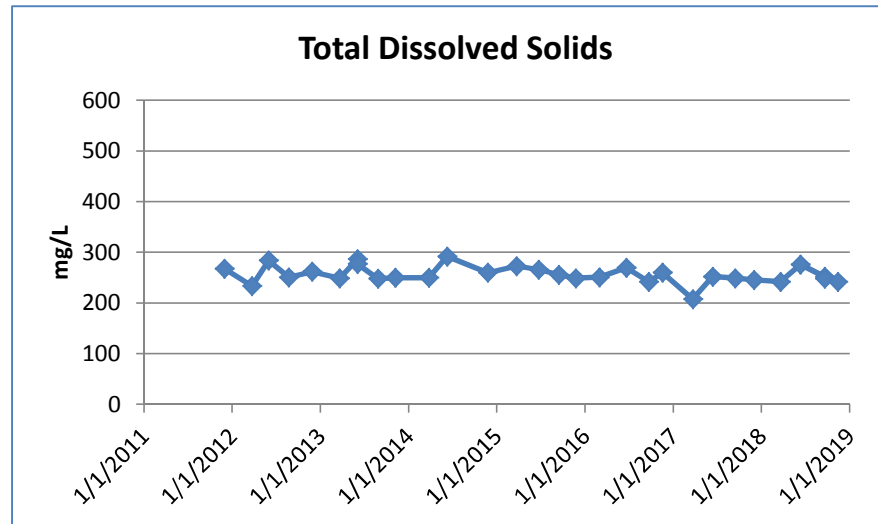
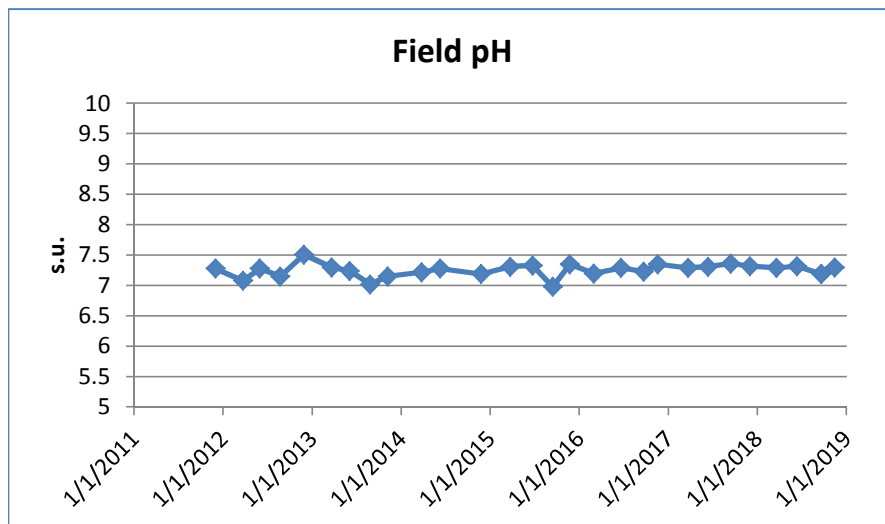
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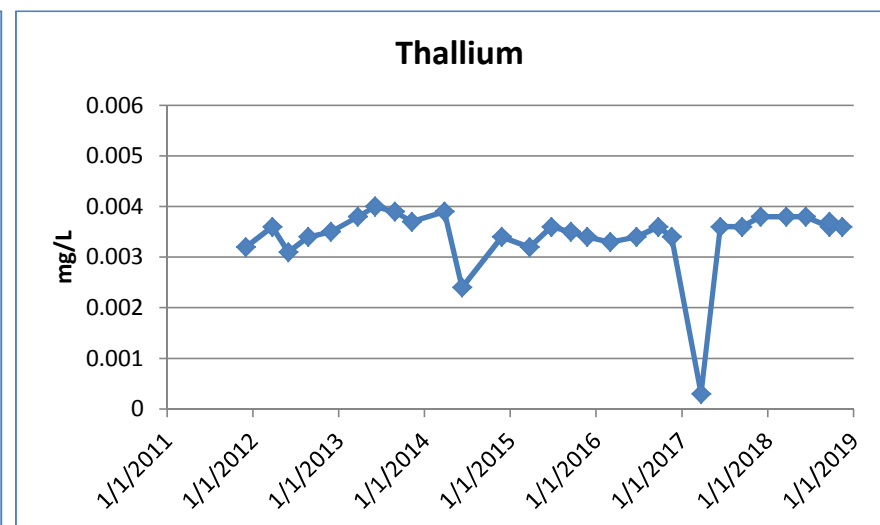
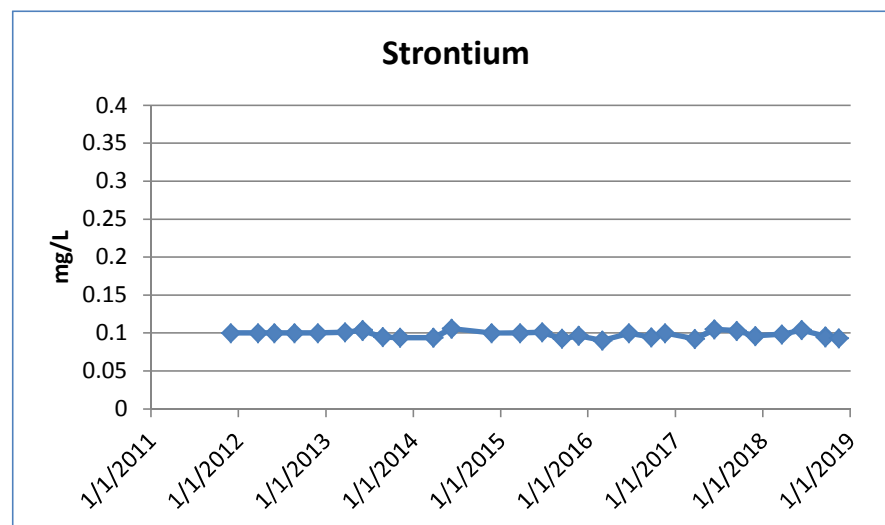
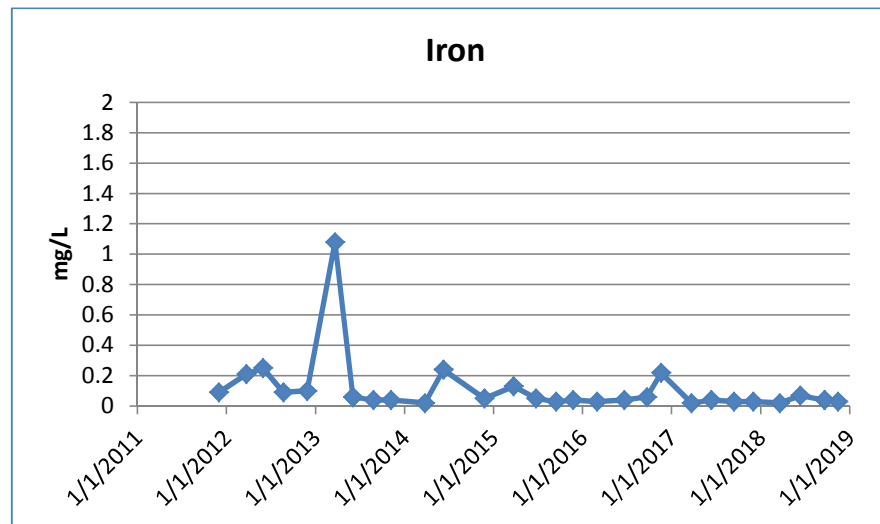
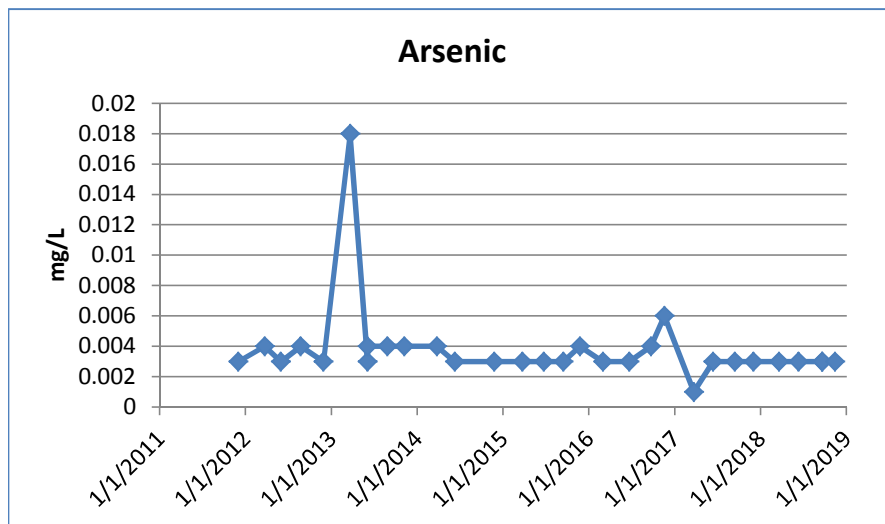
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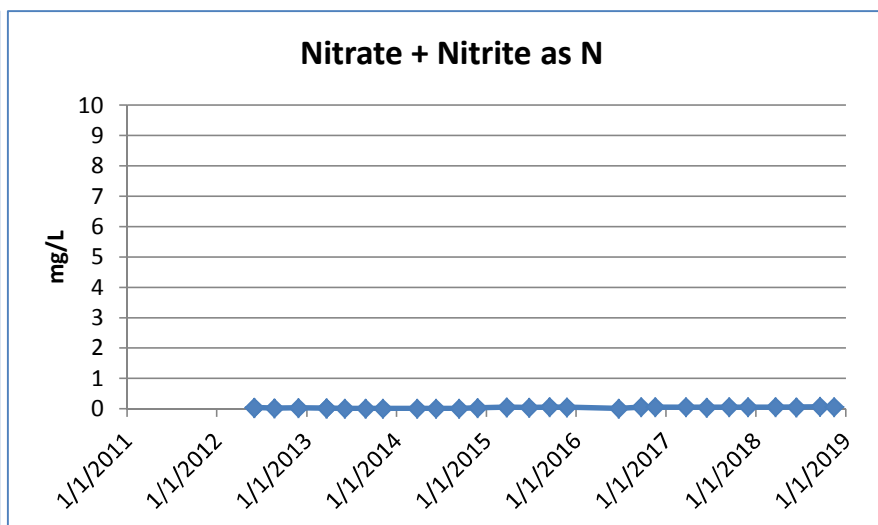
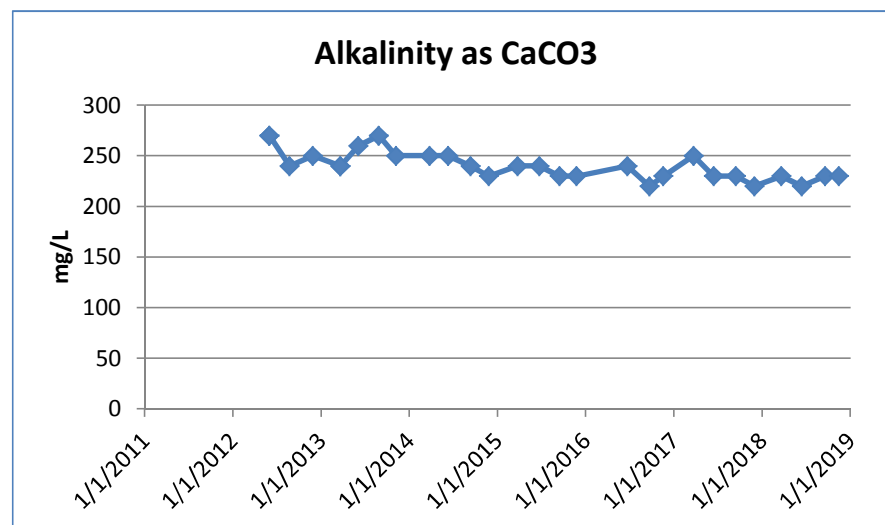
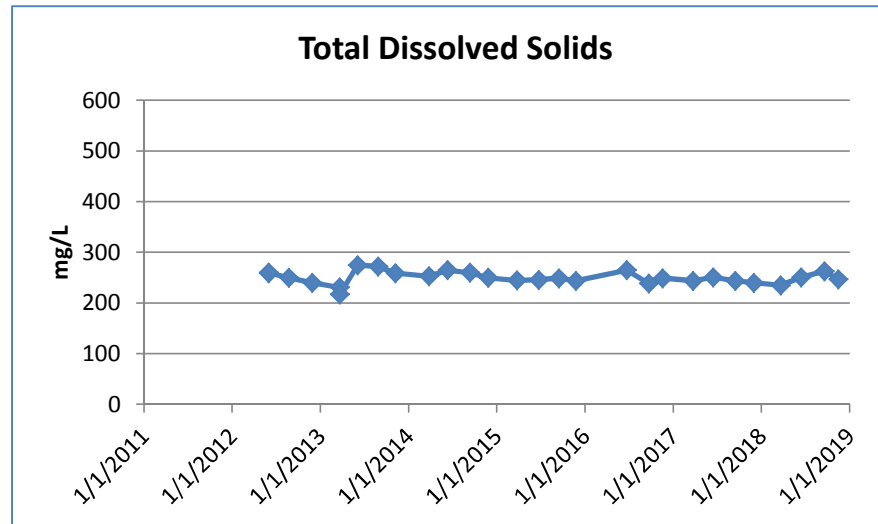
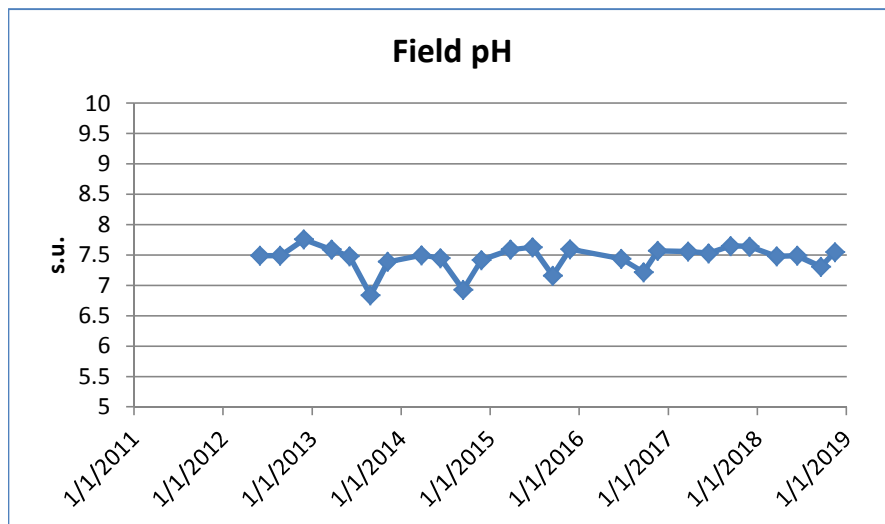
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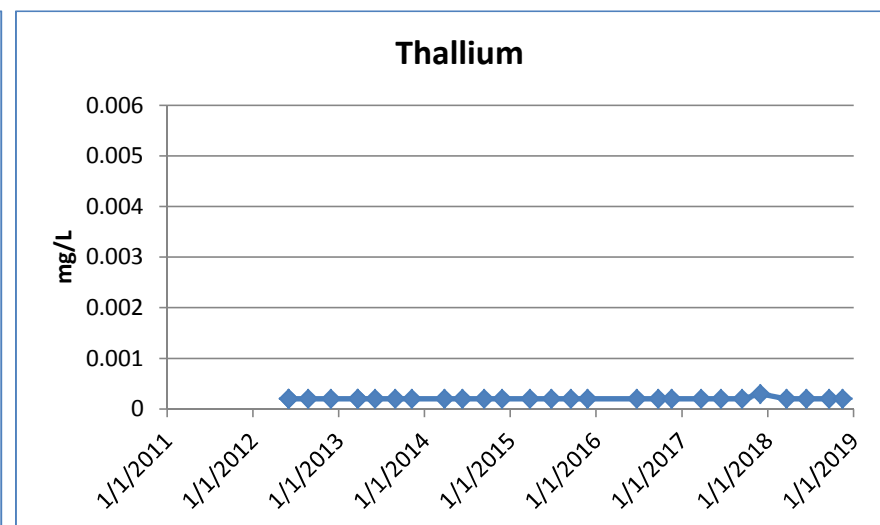
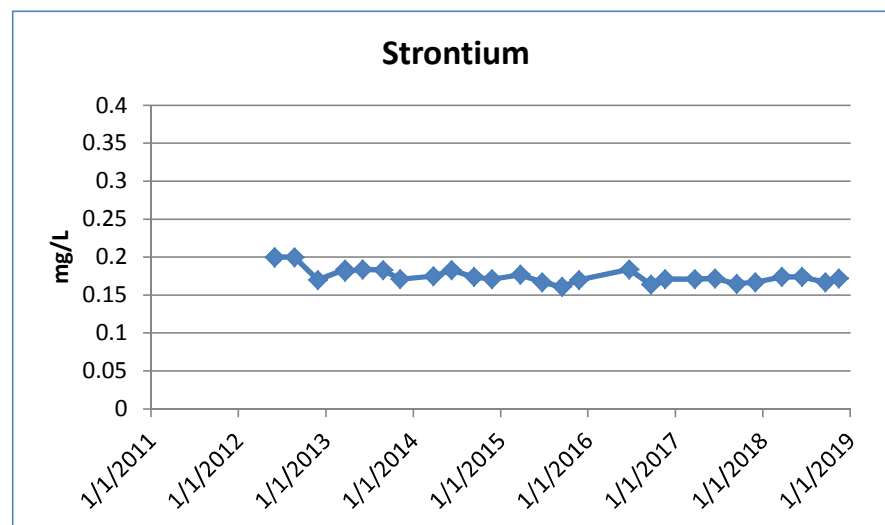
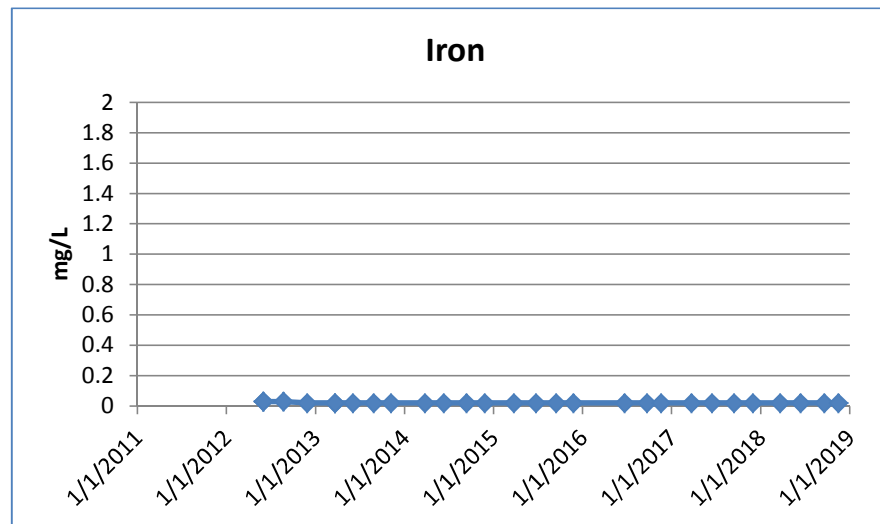
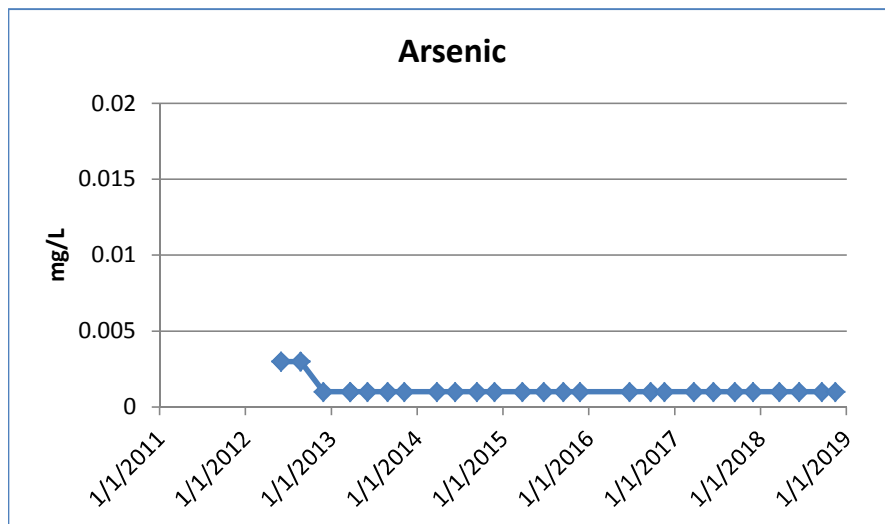
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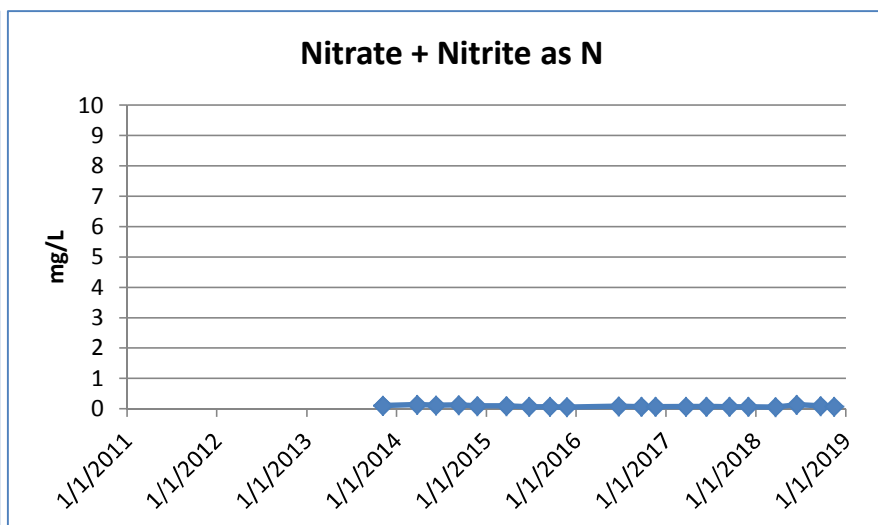
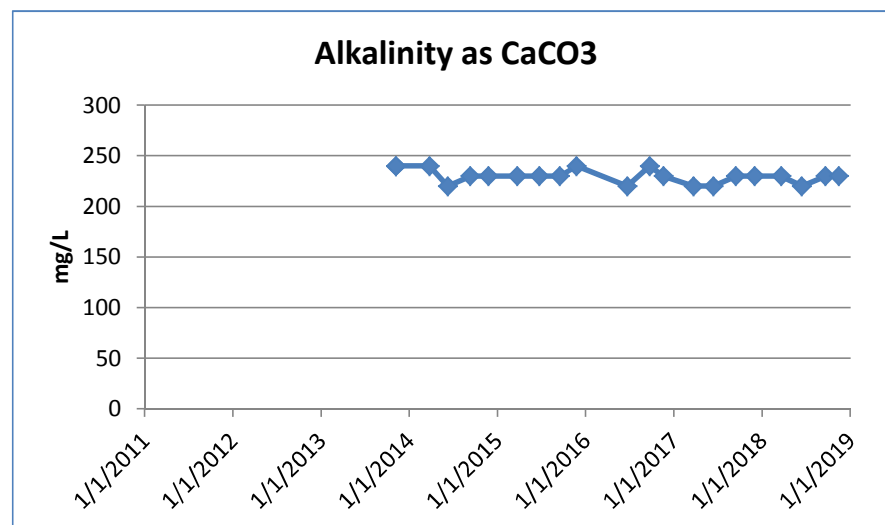
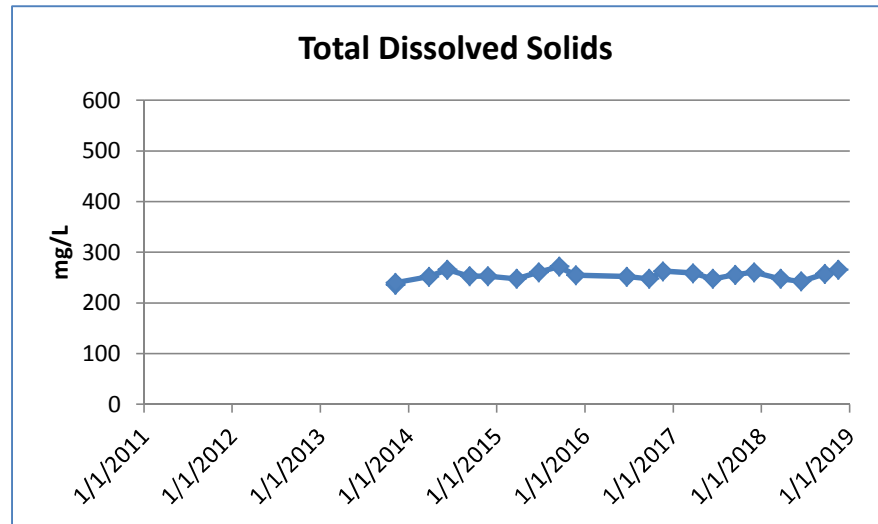
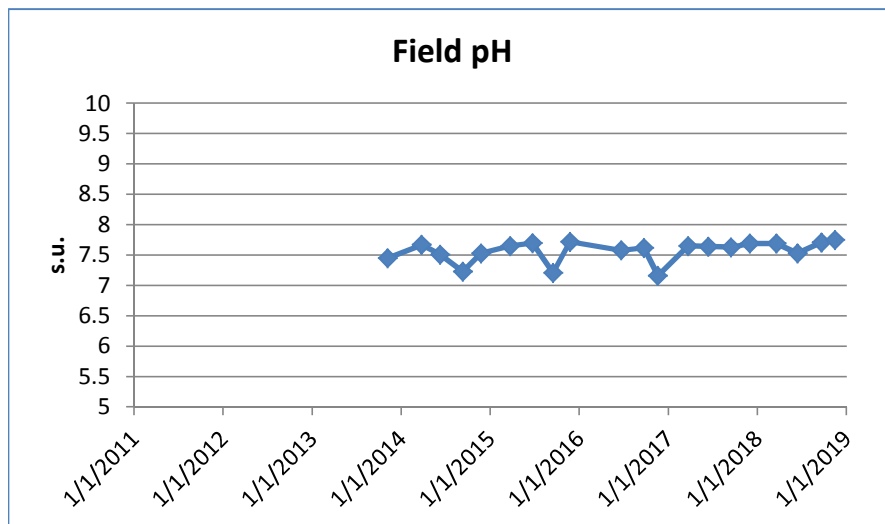
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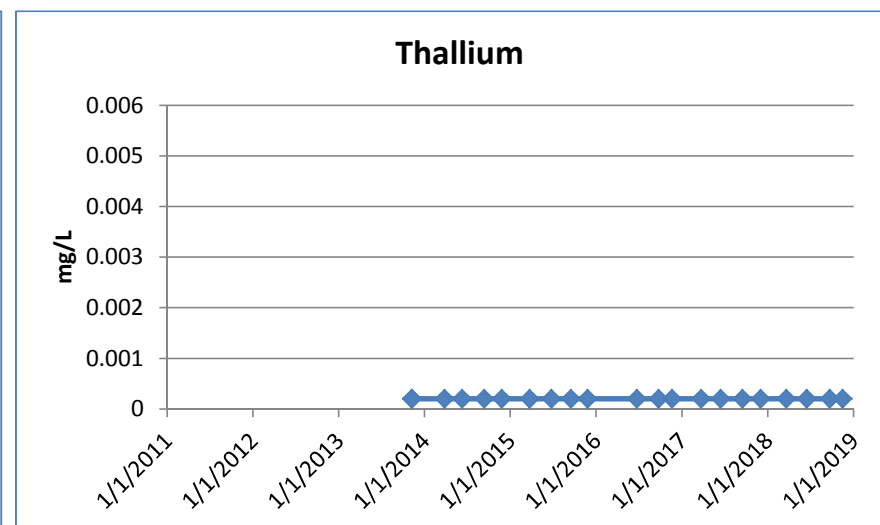
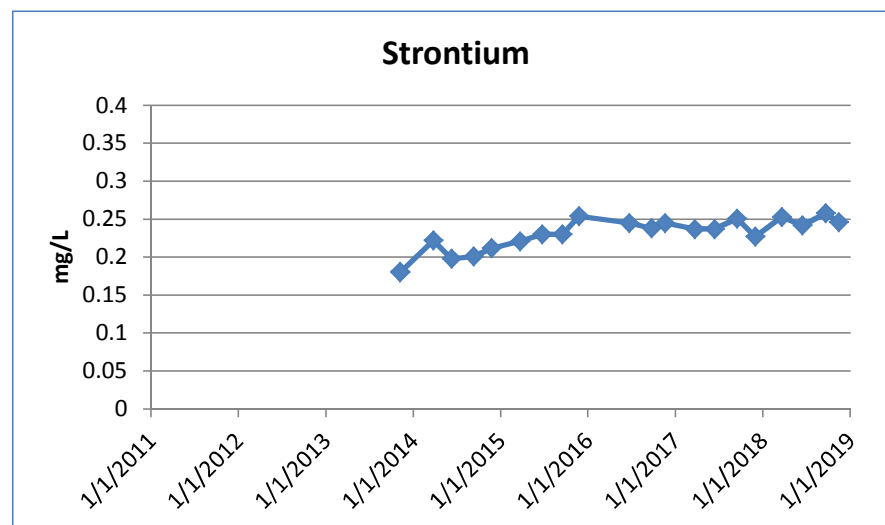
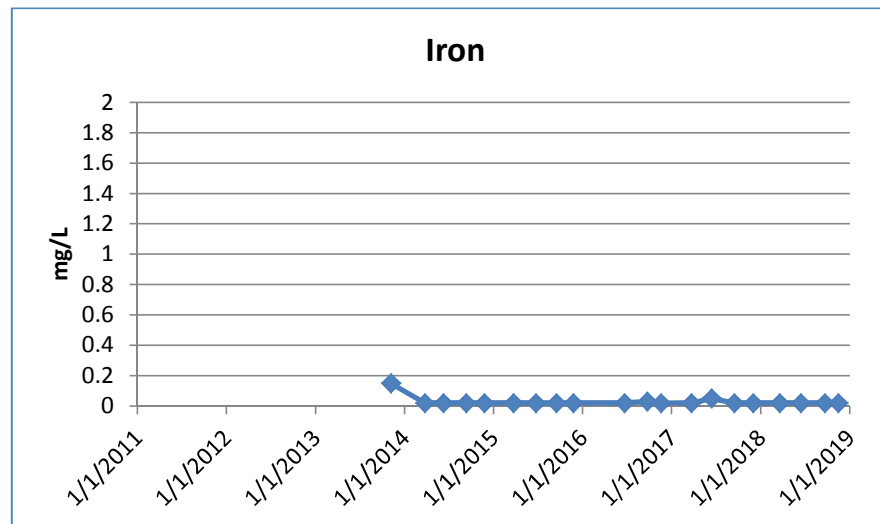
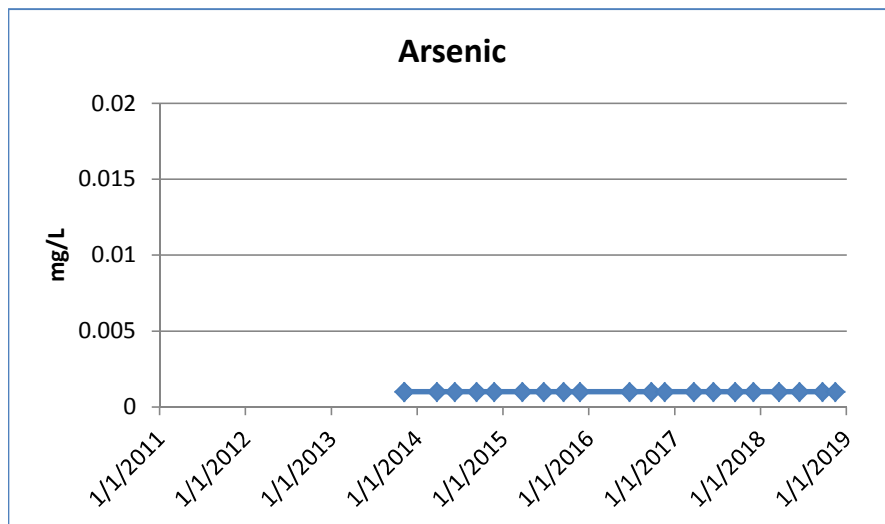
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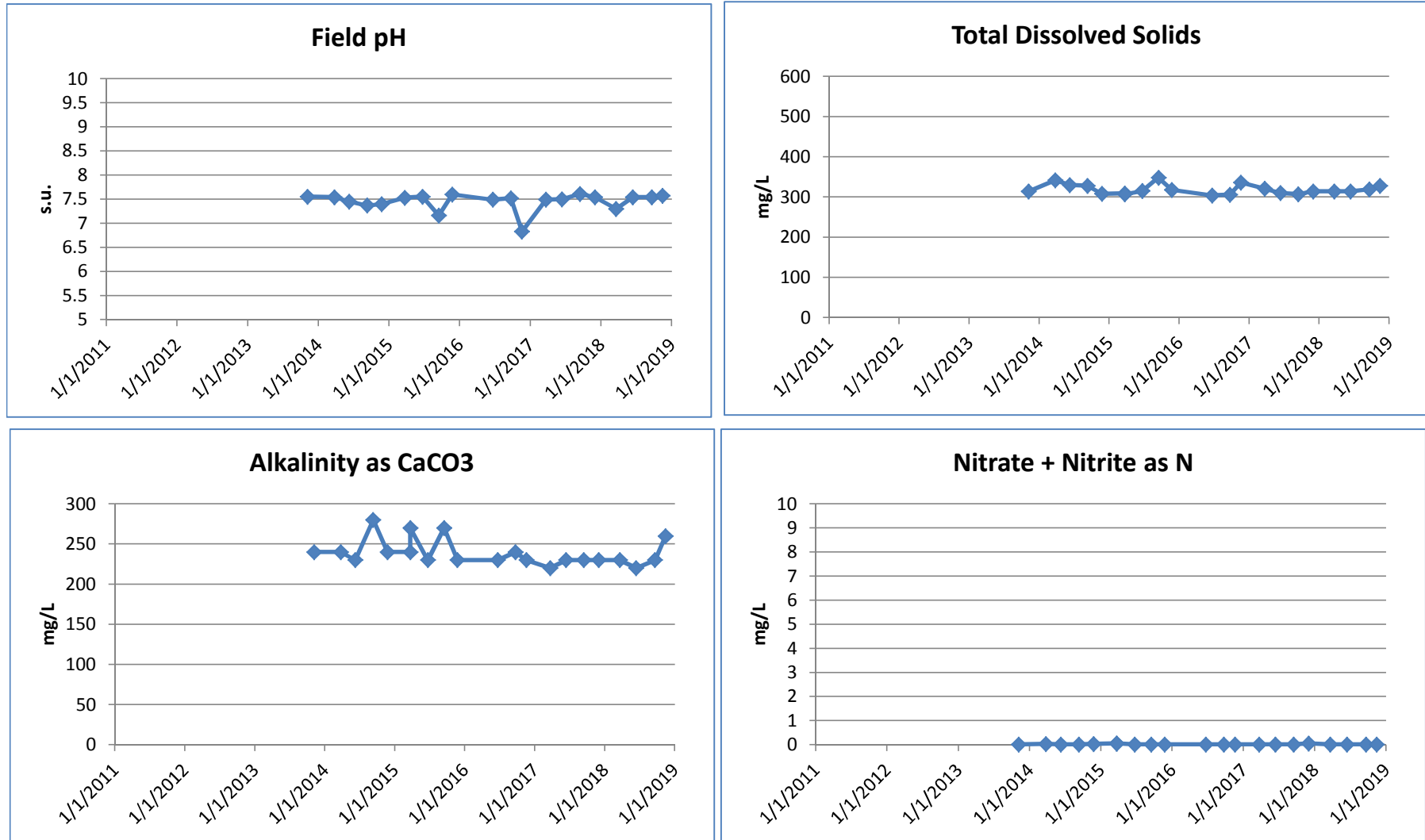
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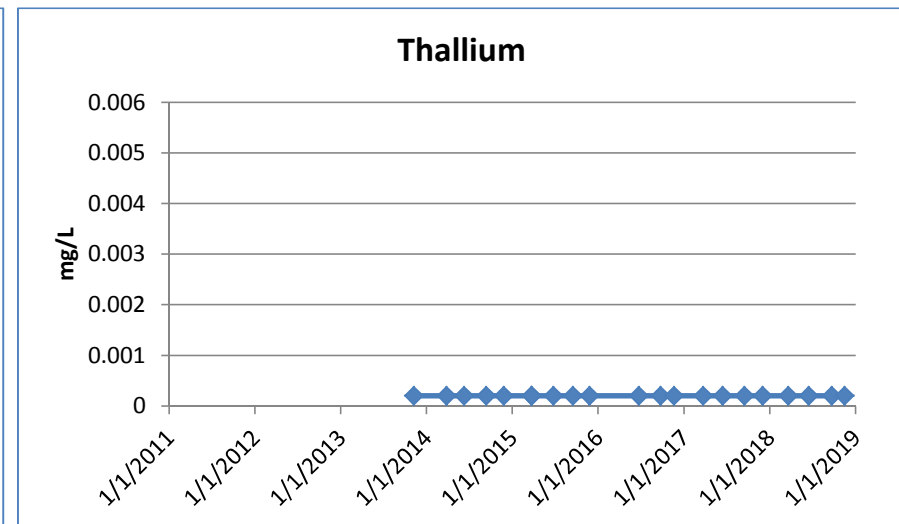
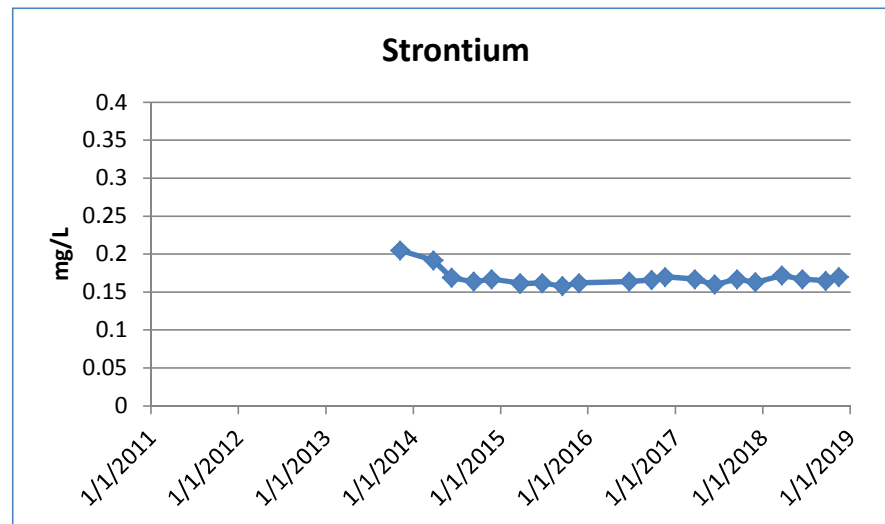
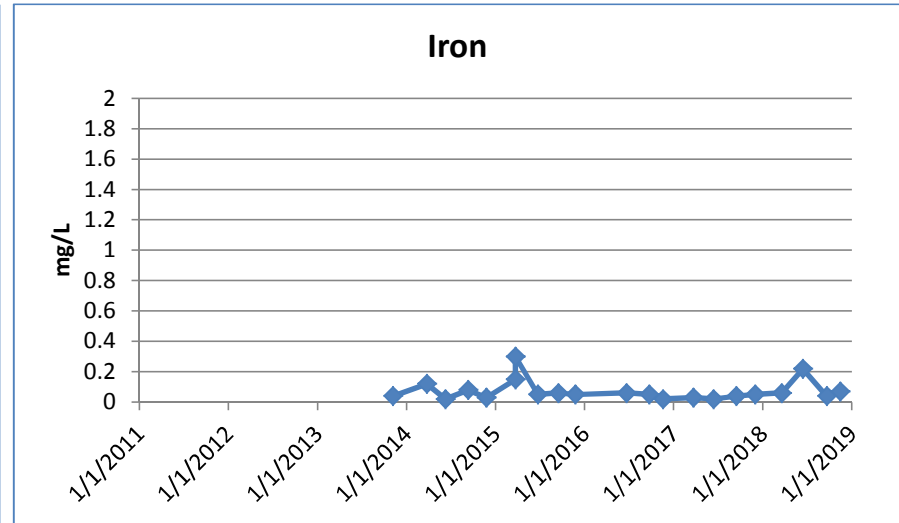
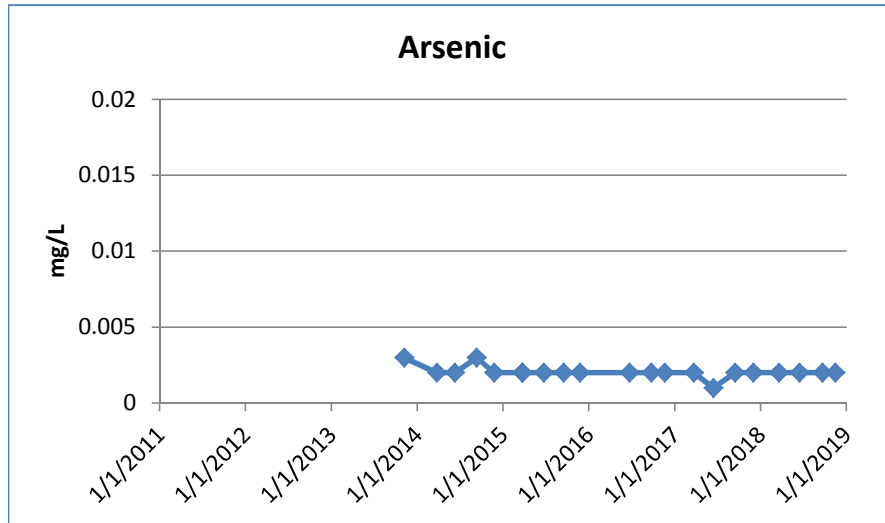
MW-6B



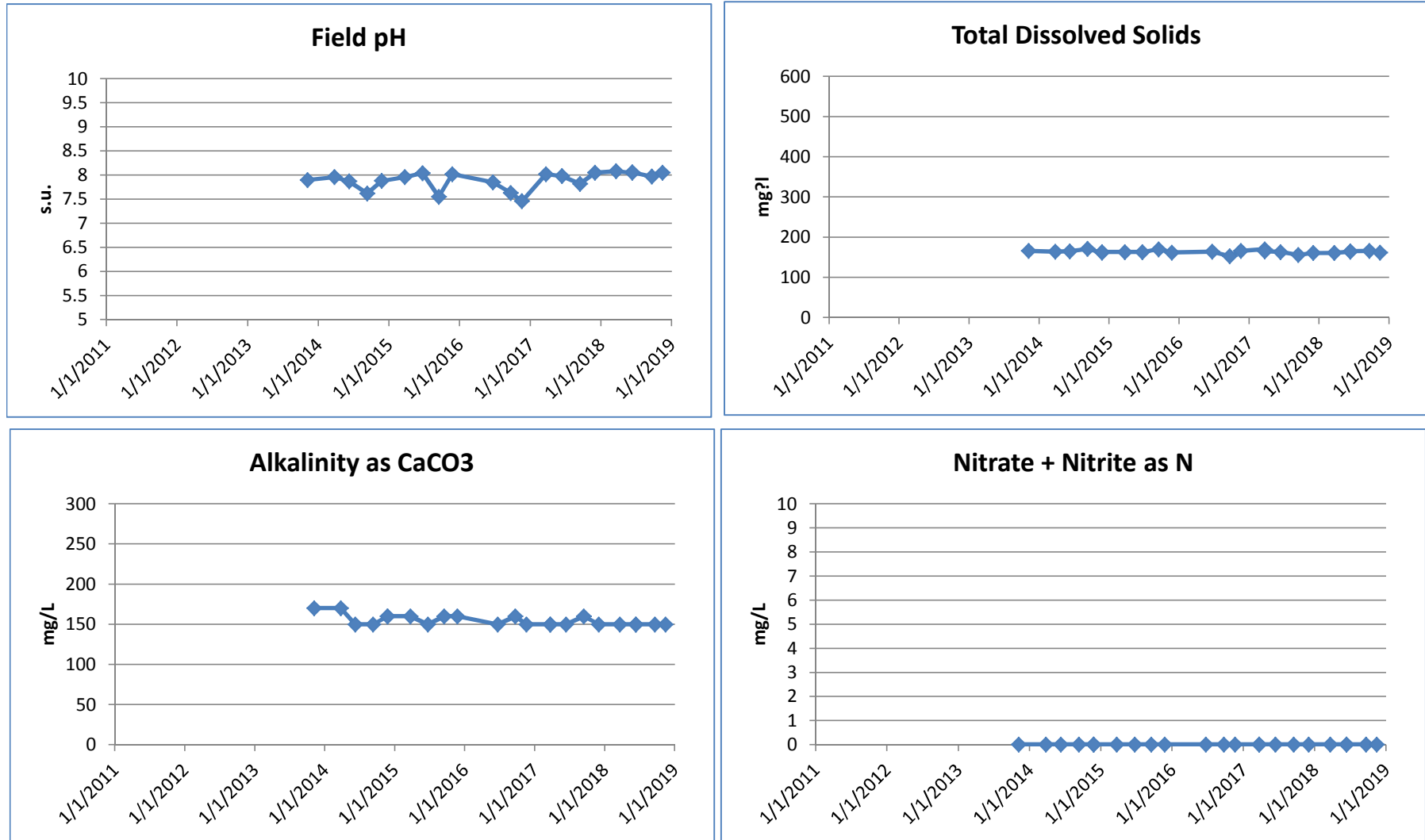
MW-7



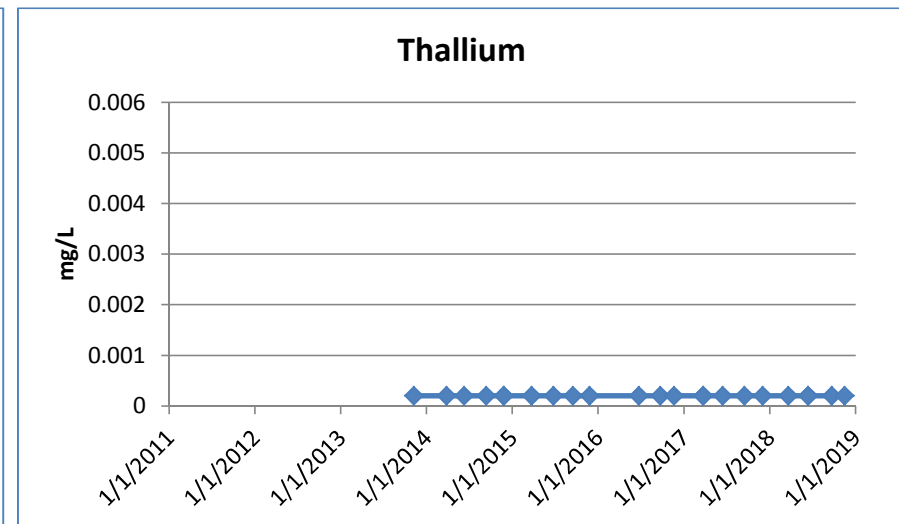
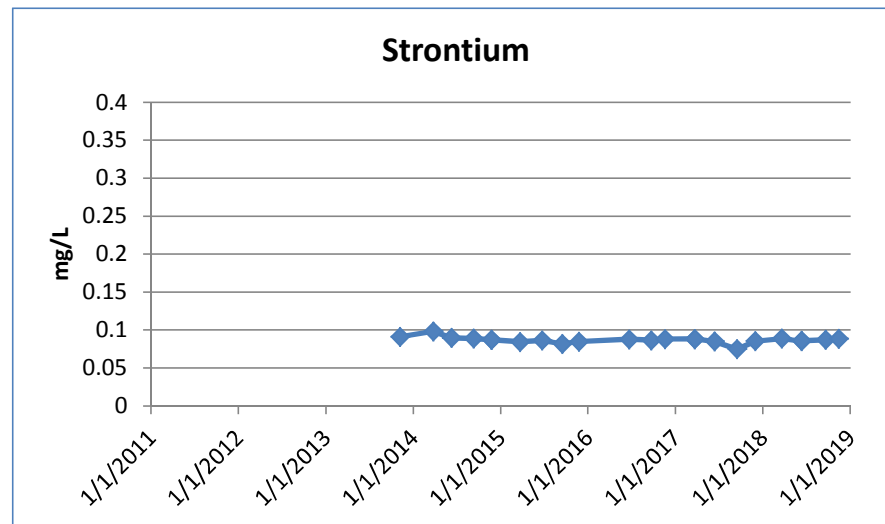
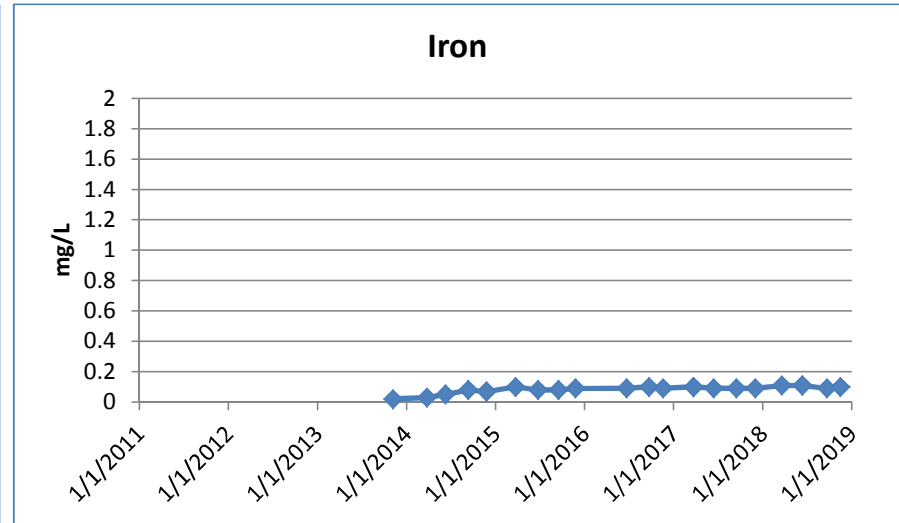
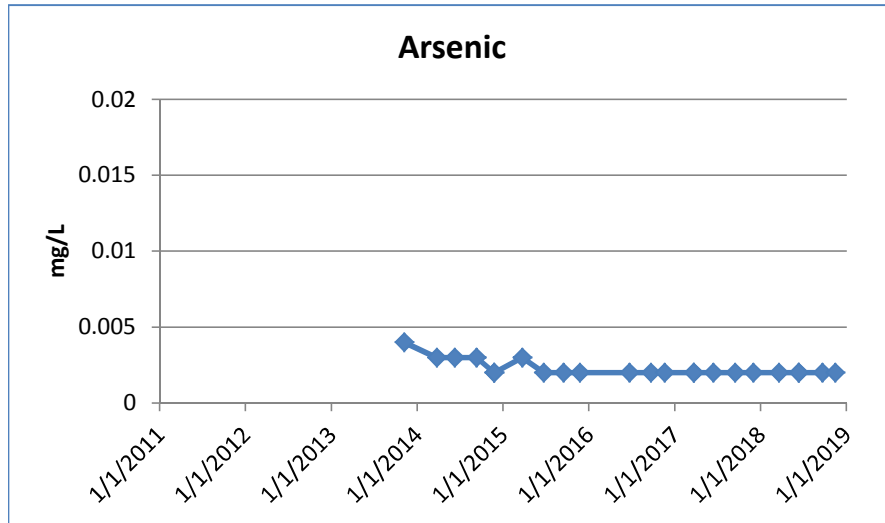
MW-7



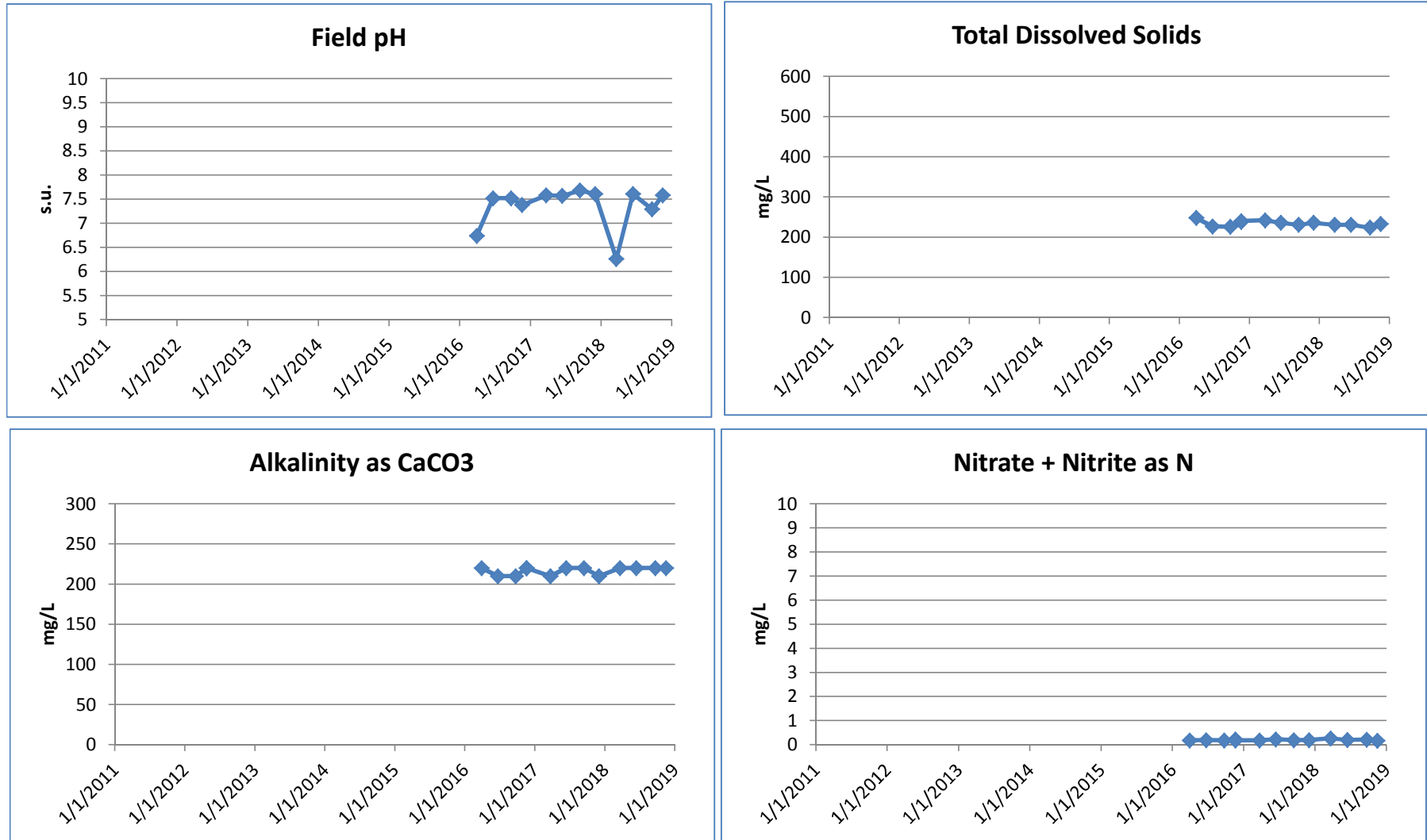
MW-8



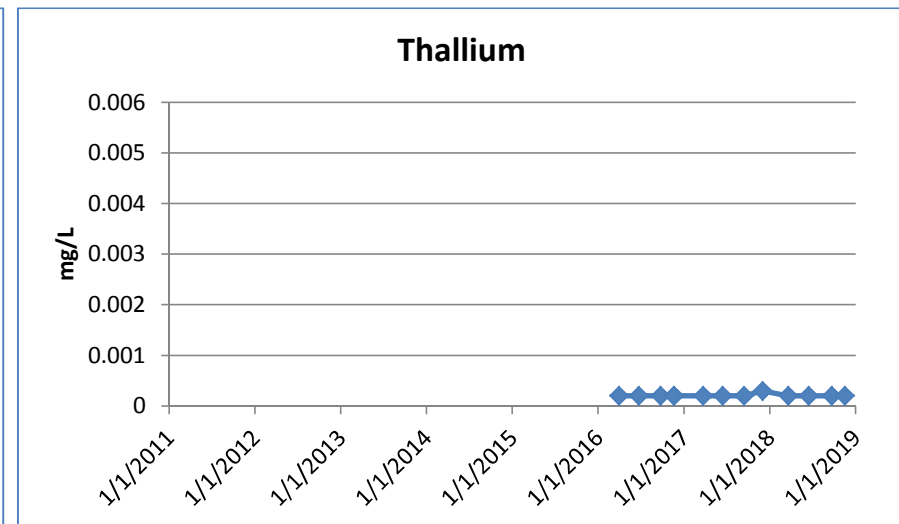
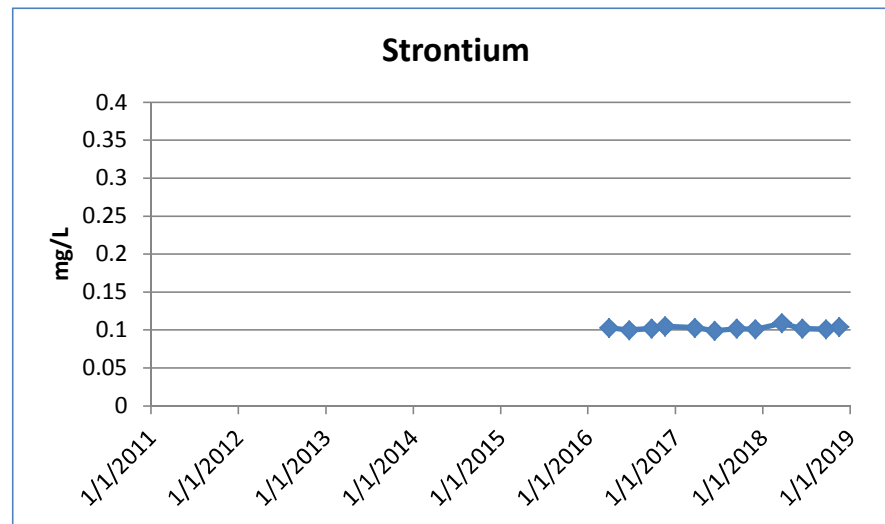
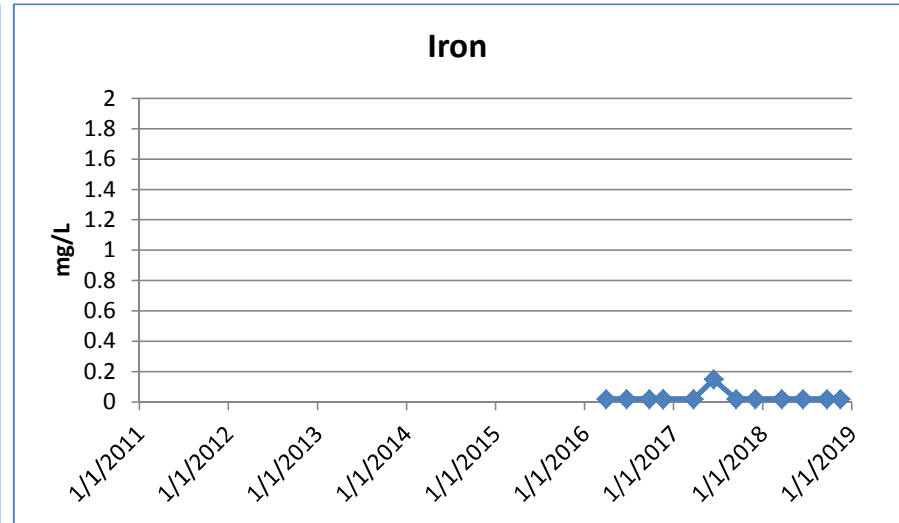
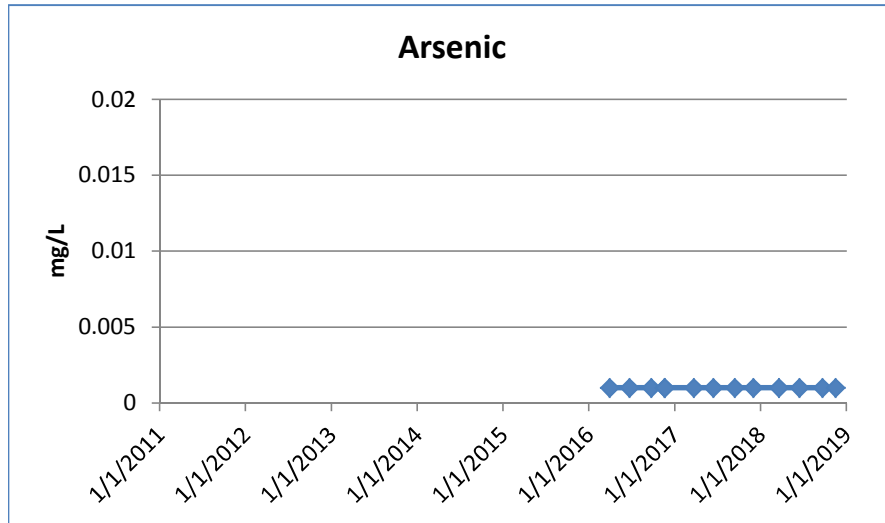
MW-8



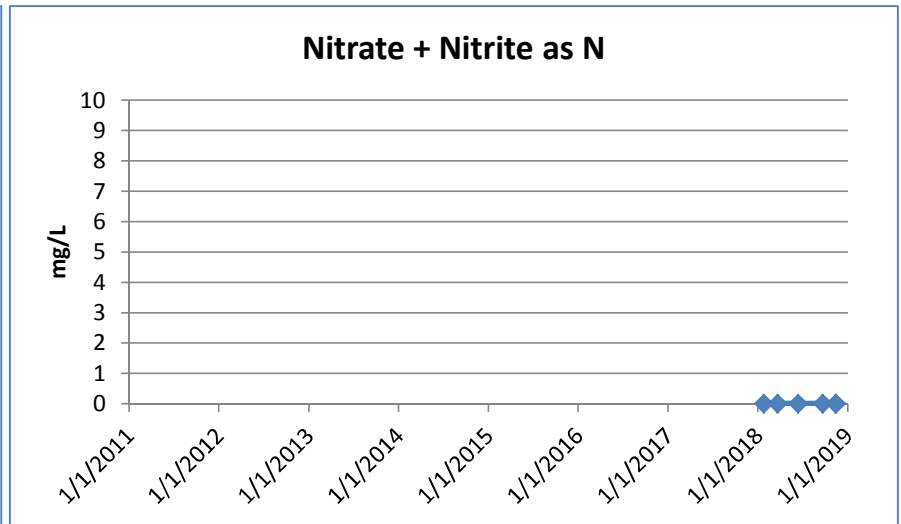
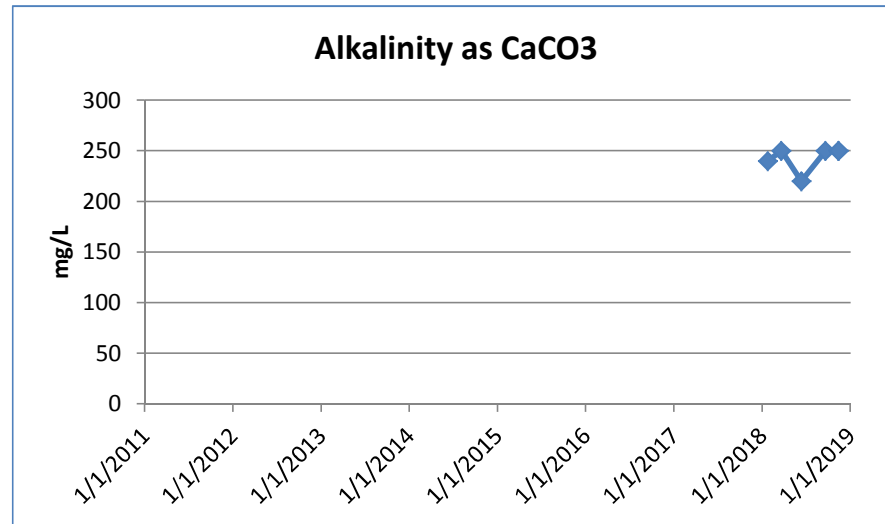
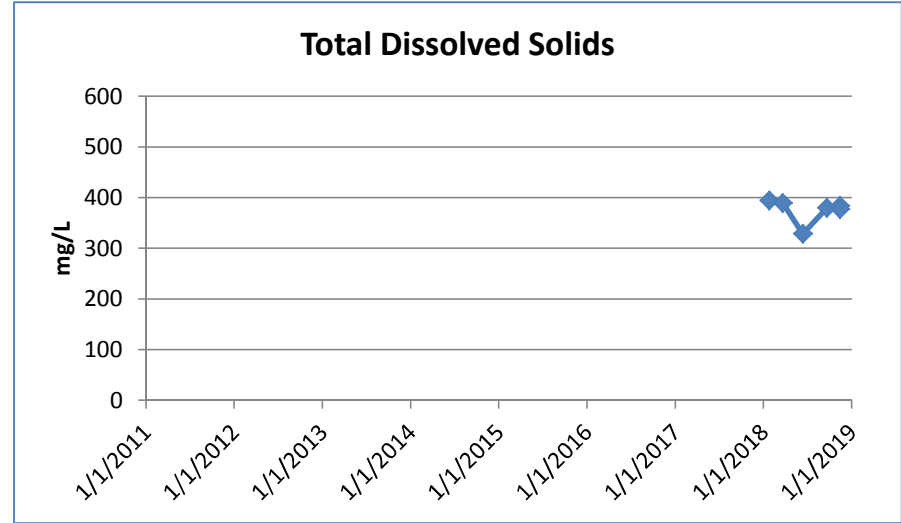
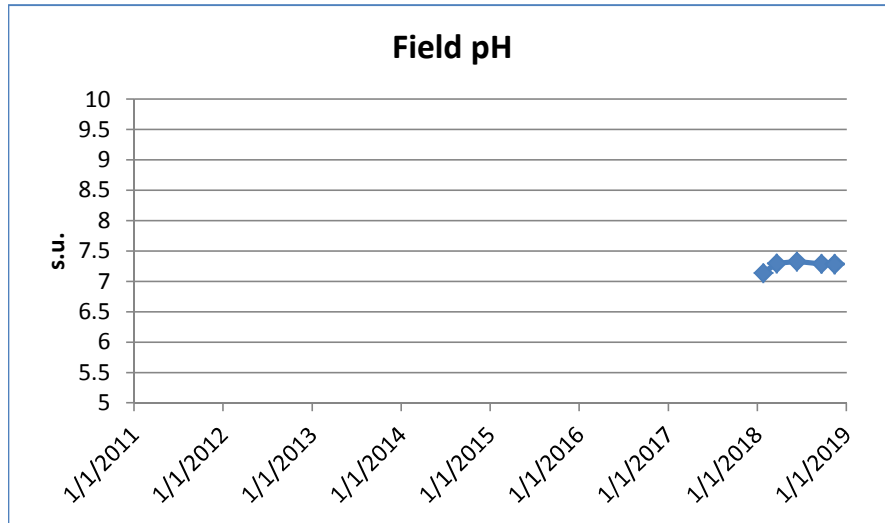
MW-13



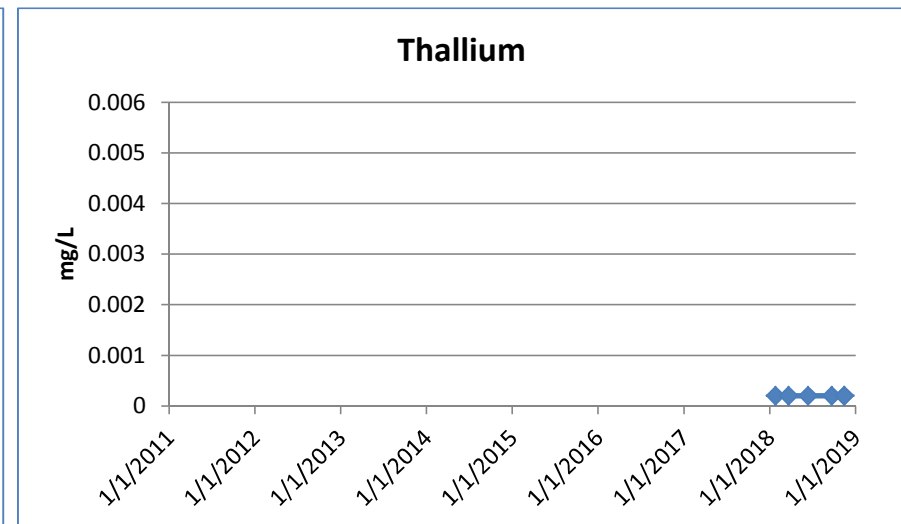
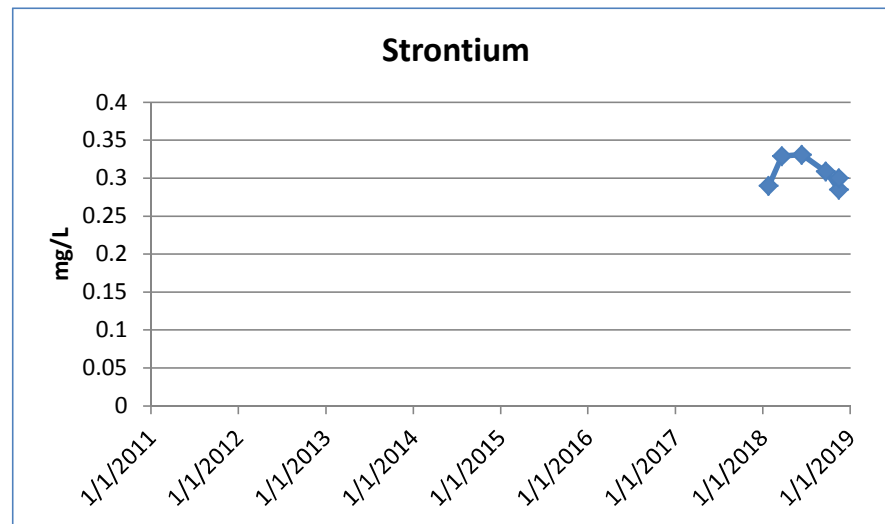
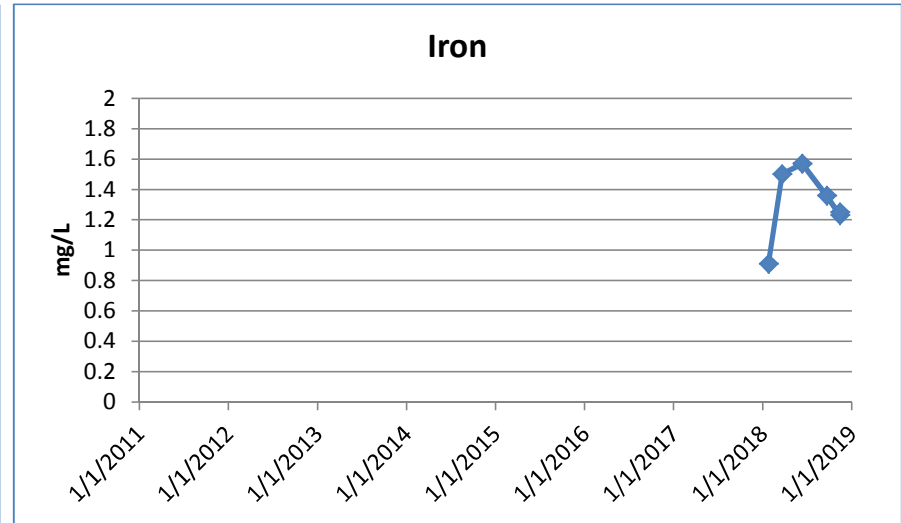
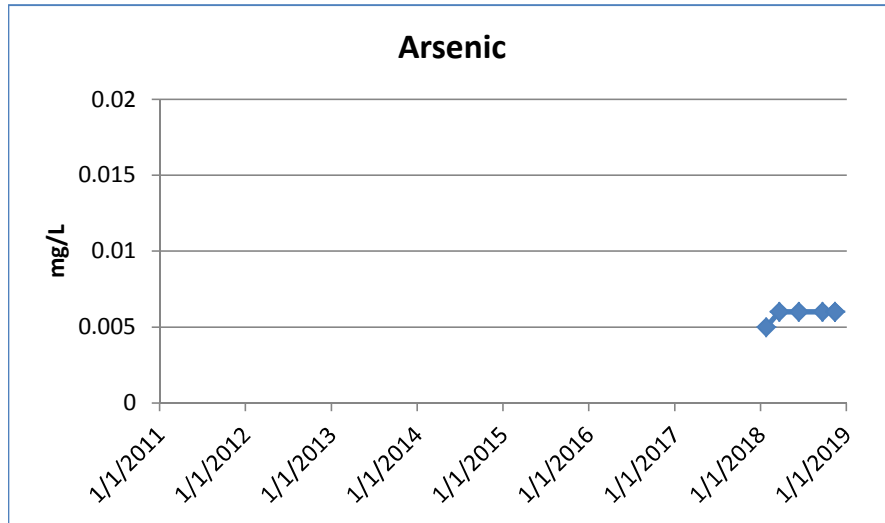
MW-13



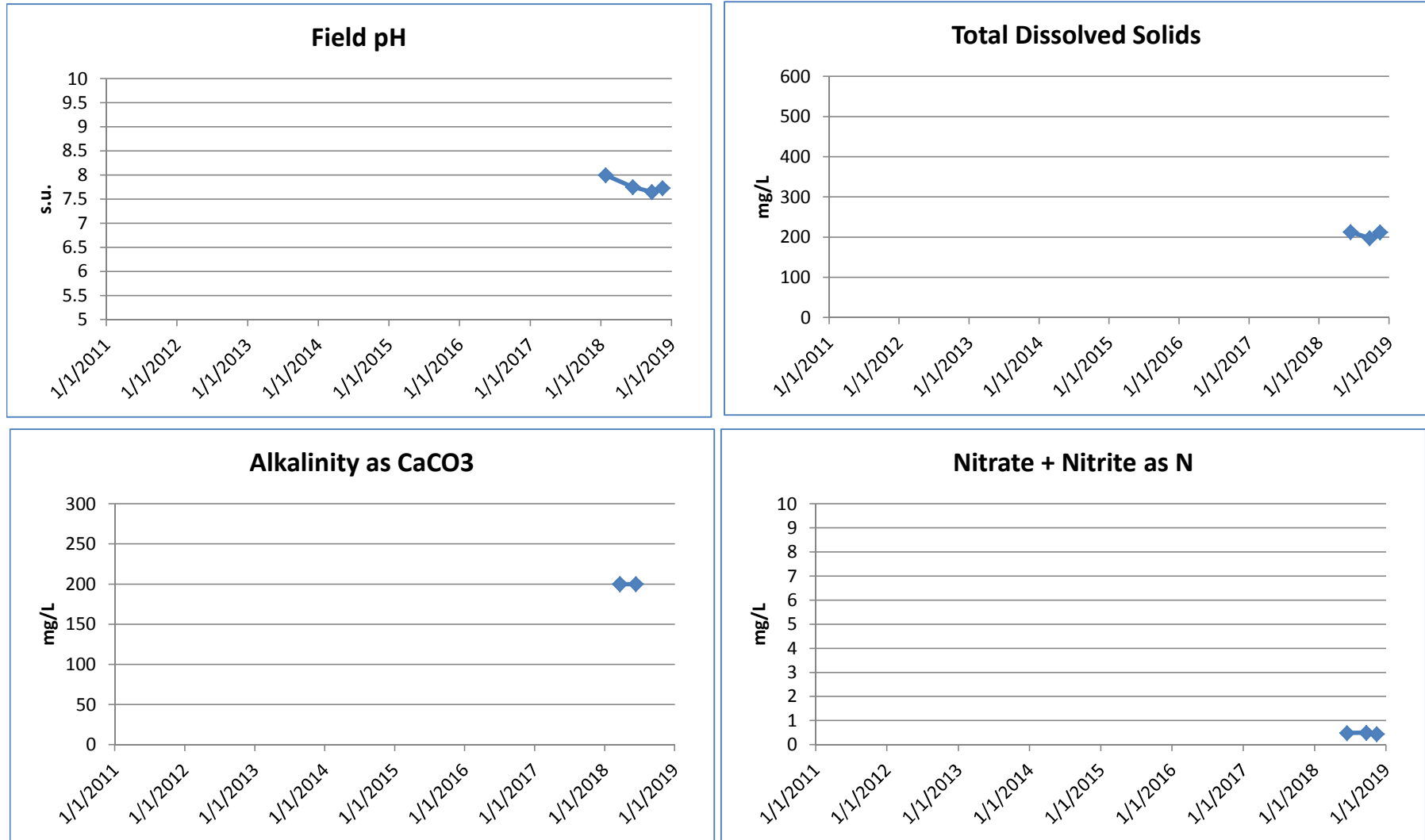
MW-16



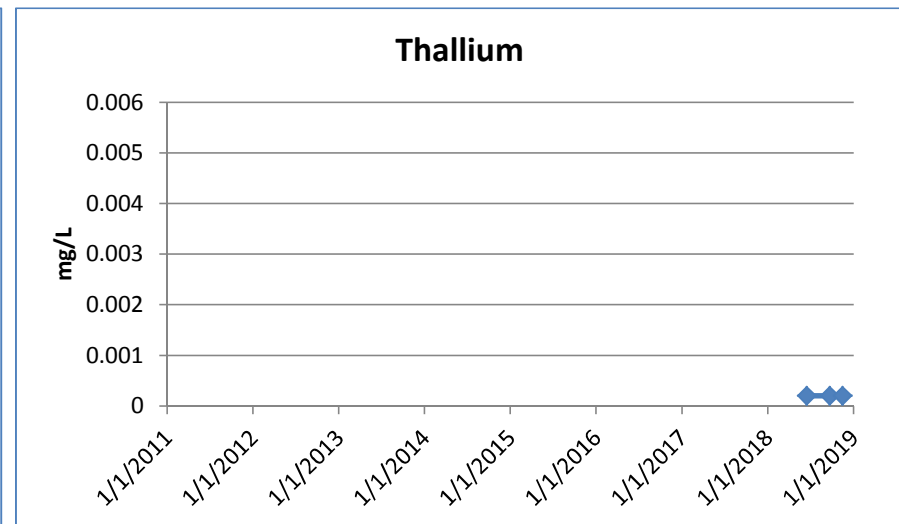
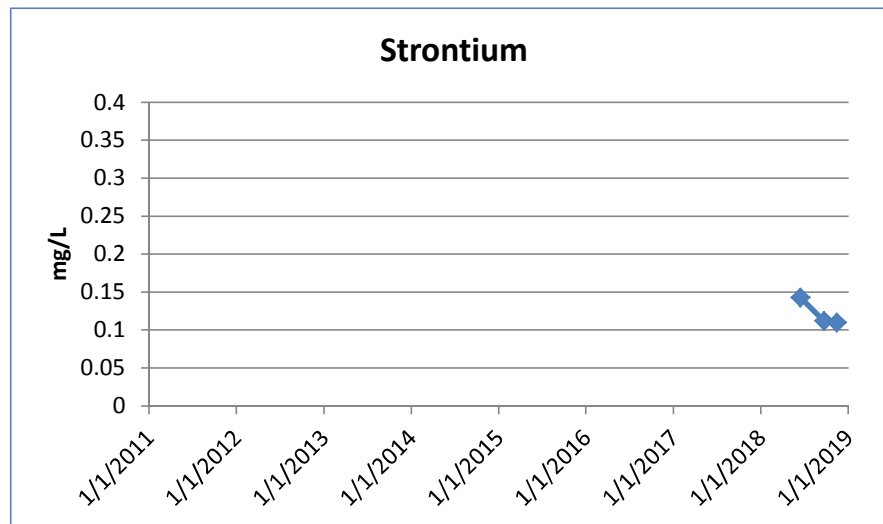
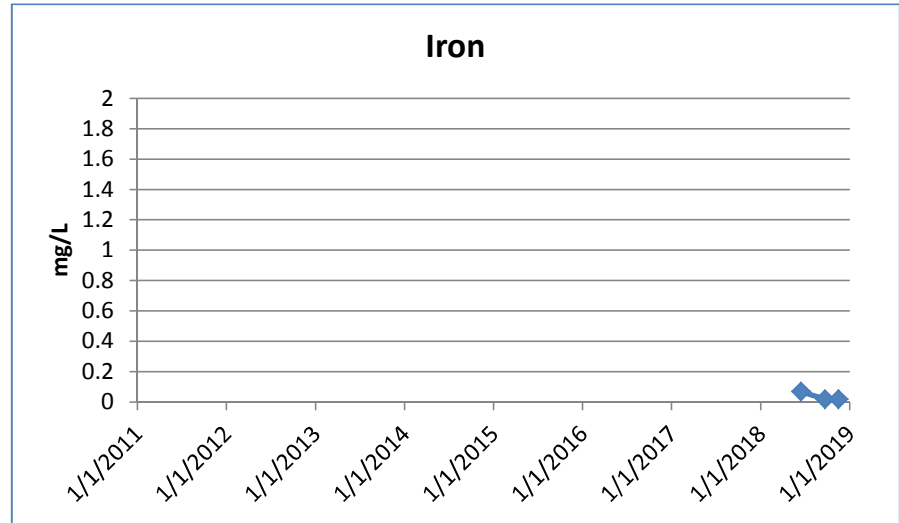
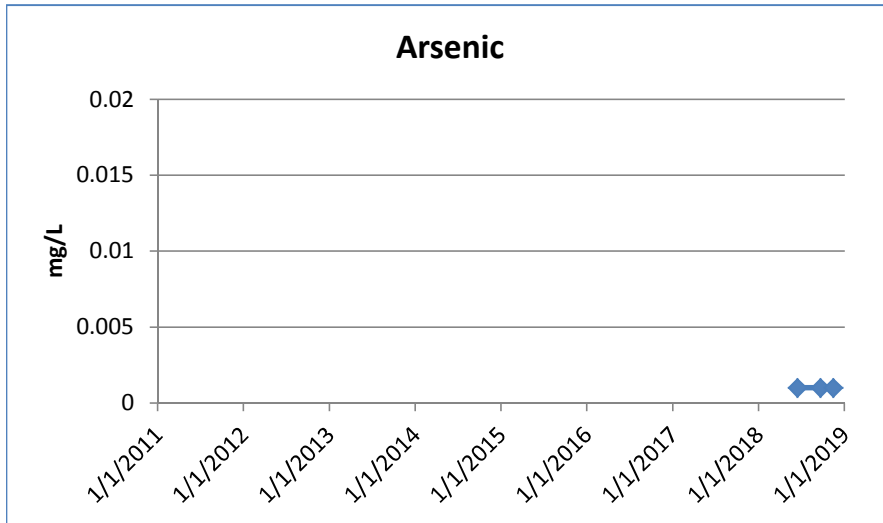
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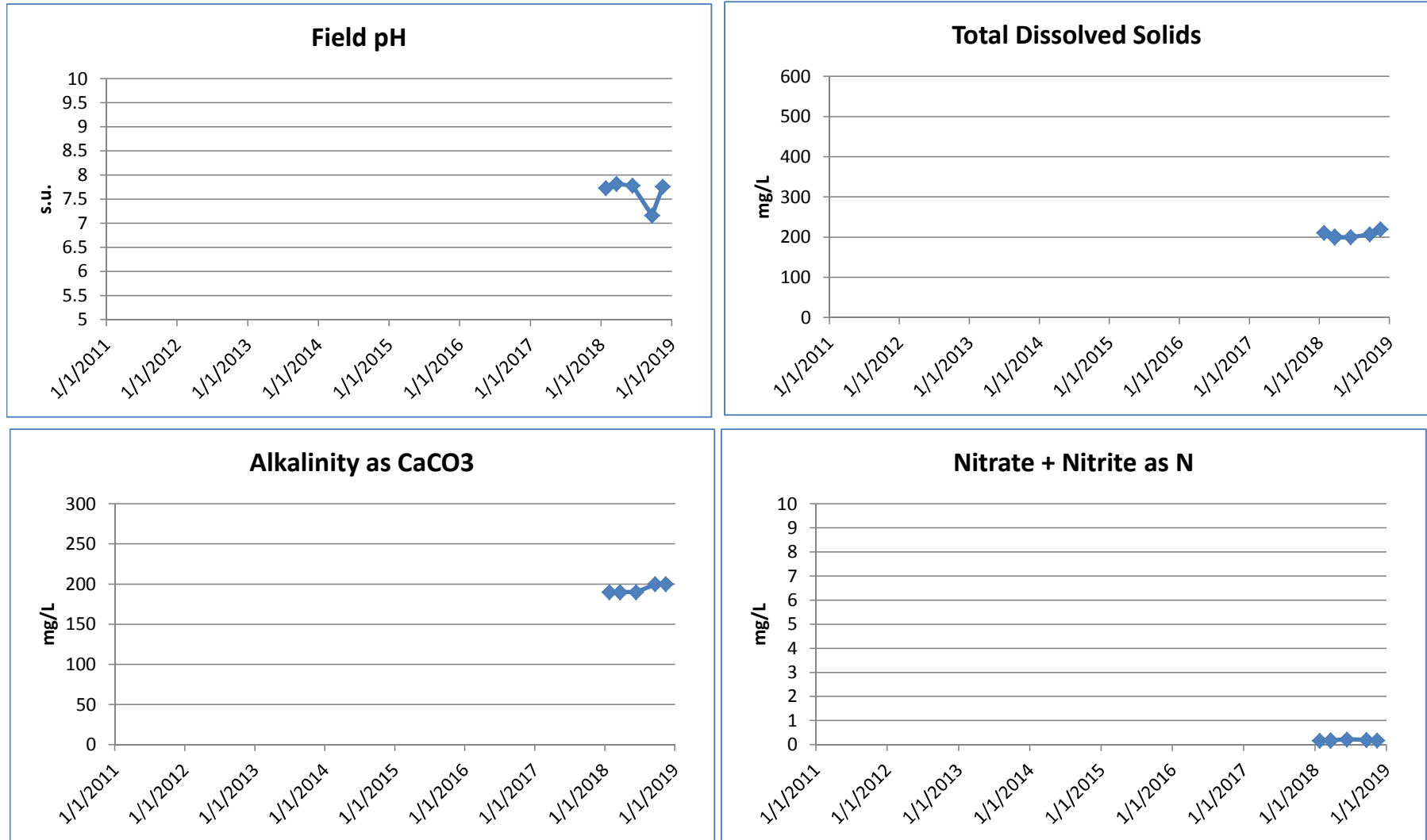
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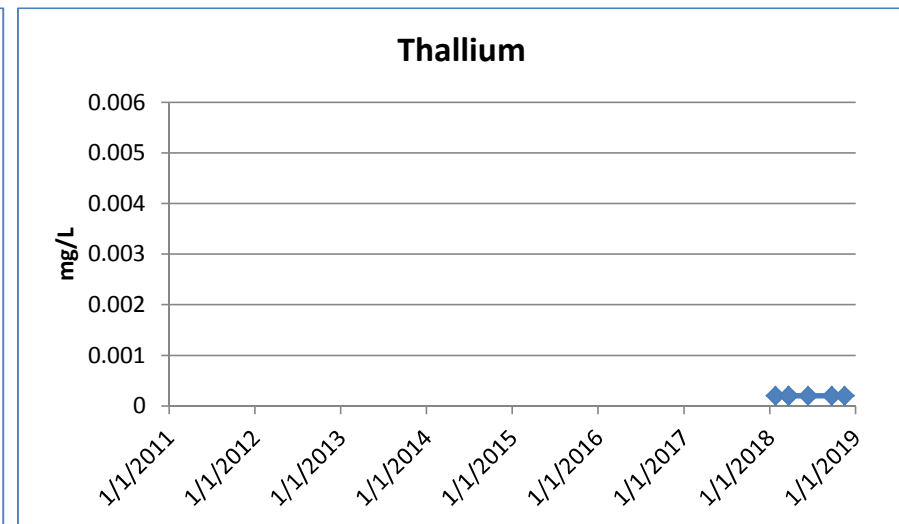
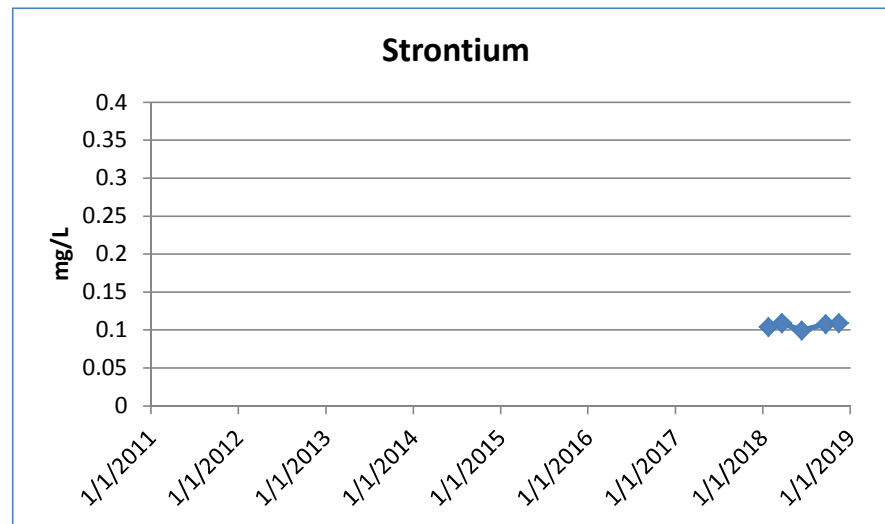
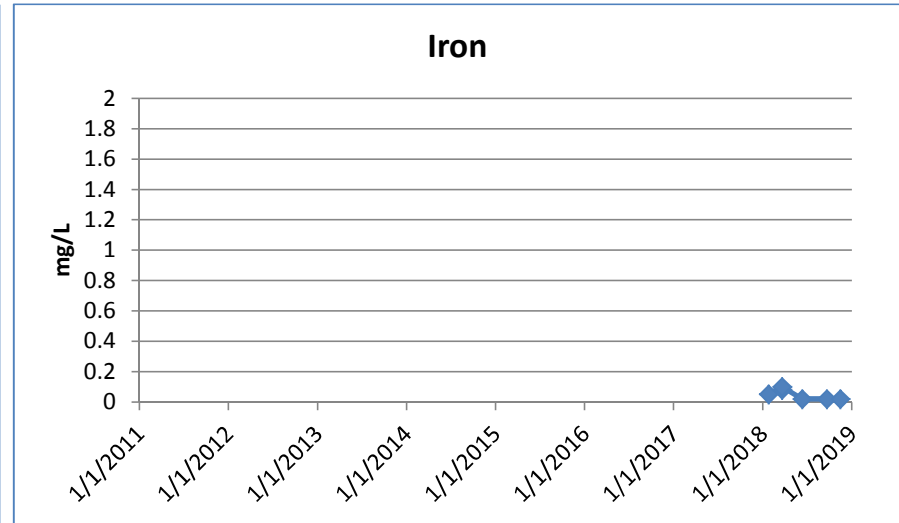
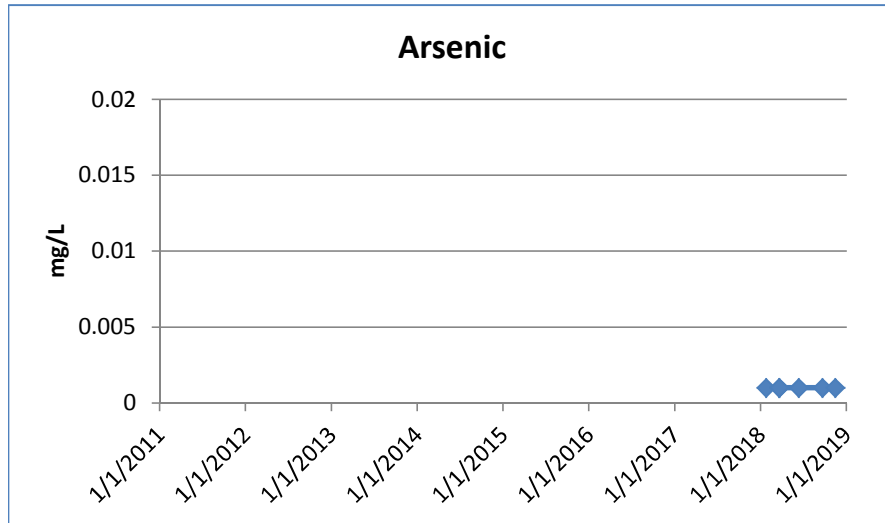
MW-17



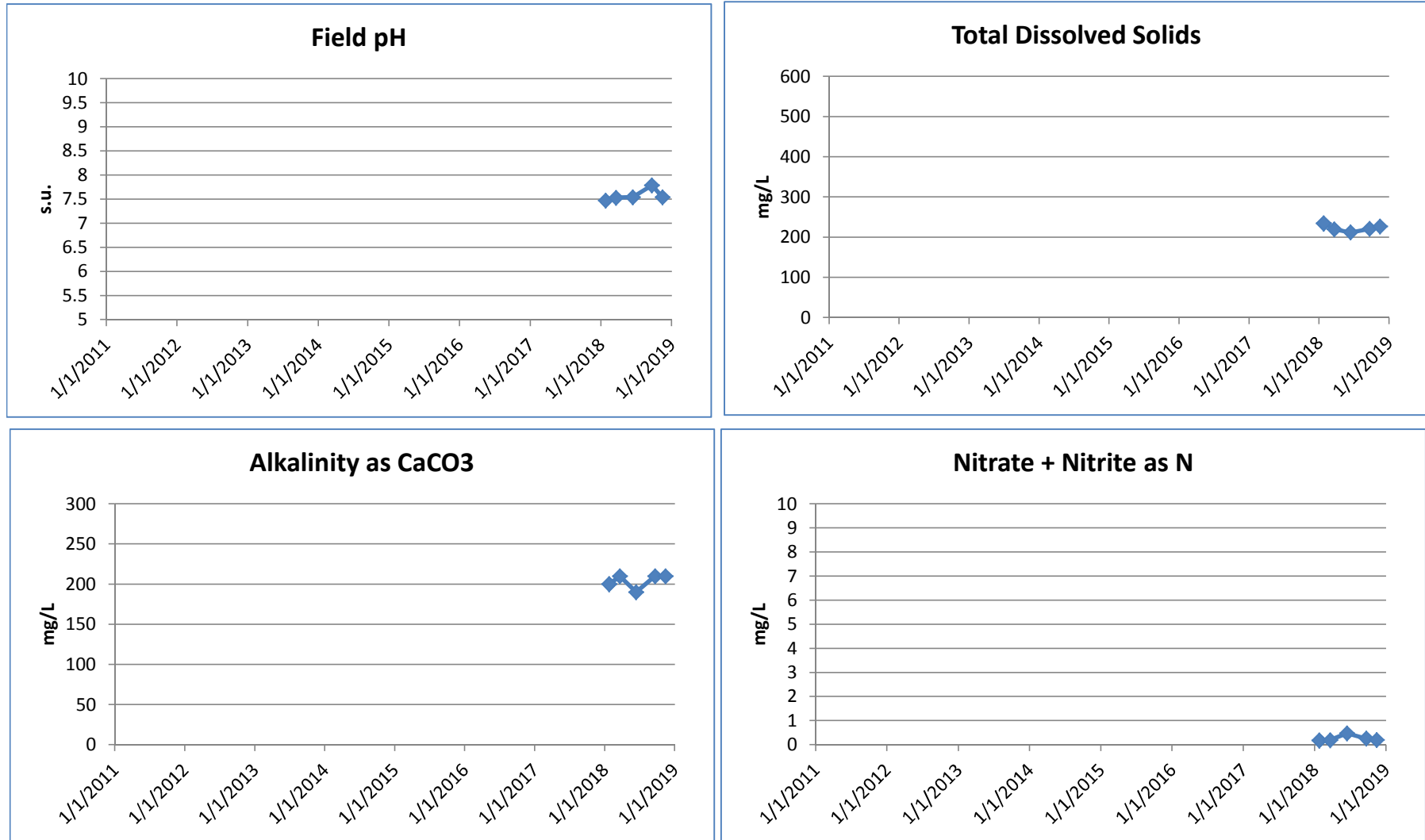
MW-18



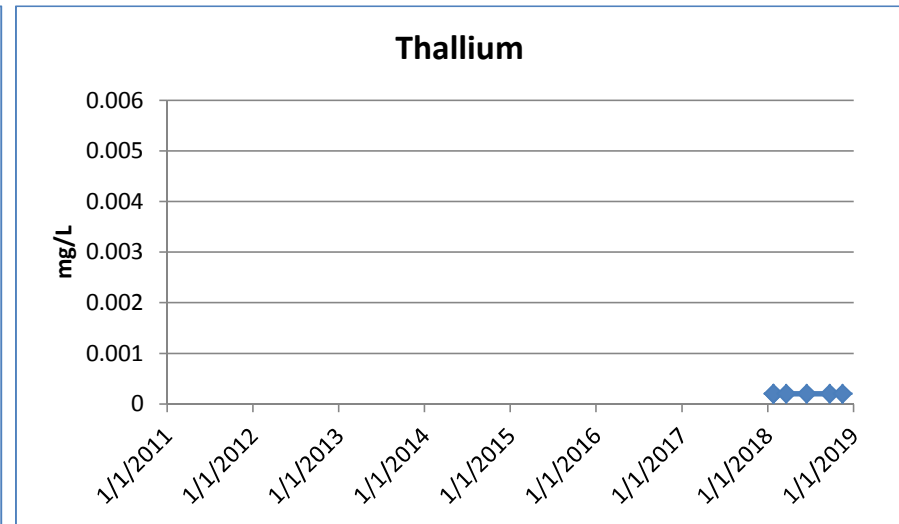
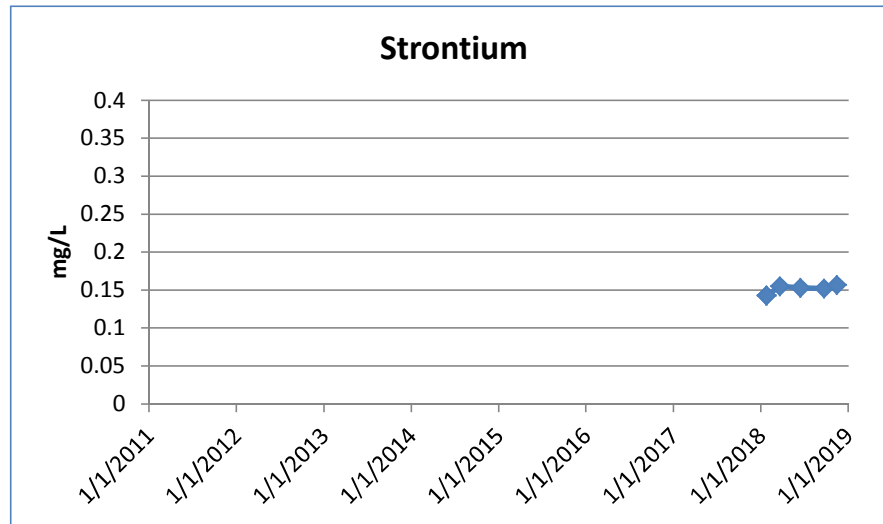
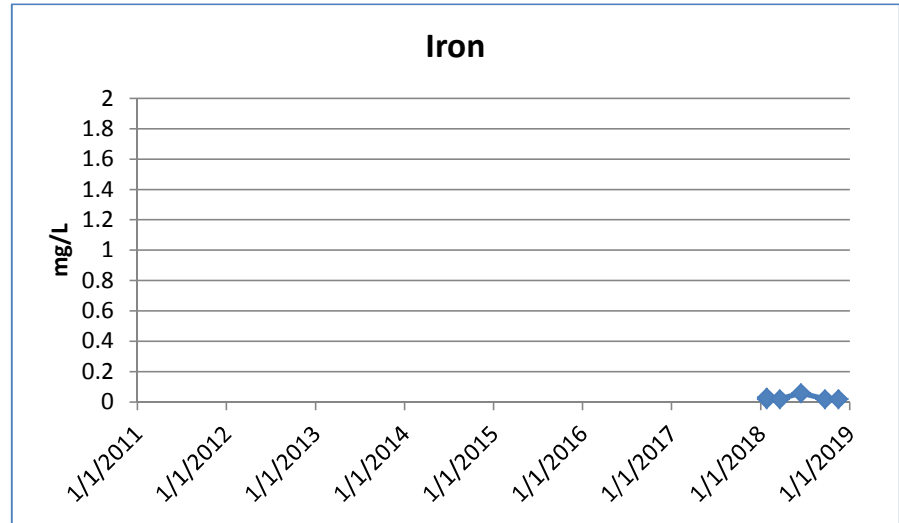
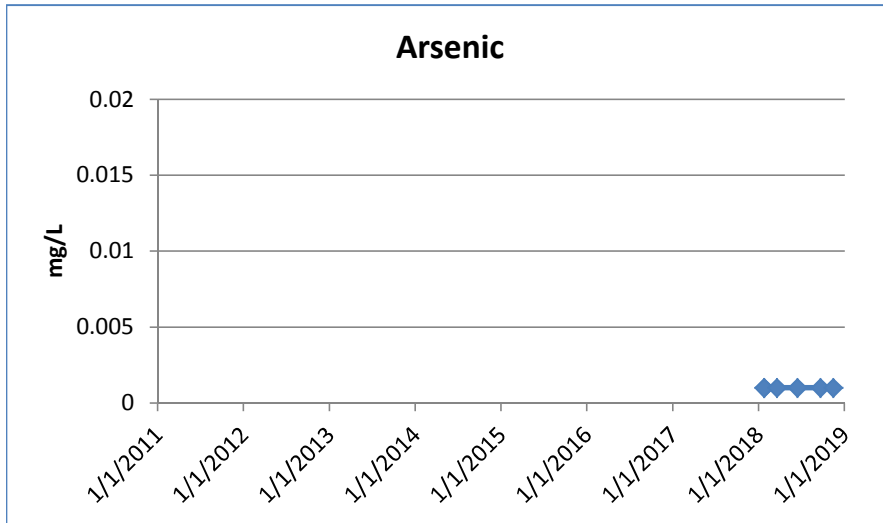
MW-18



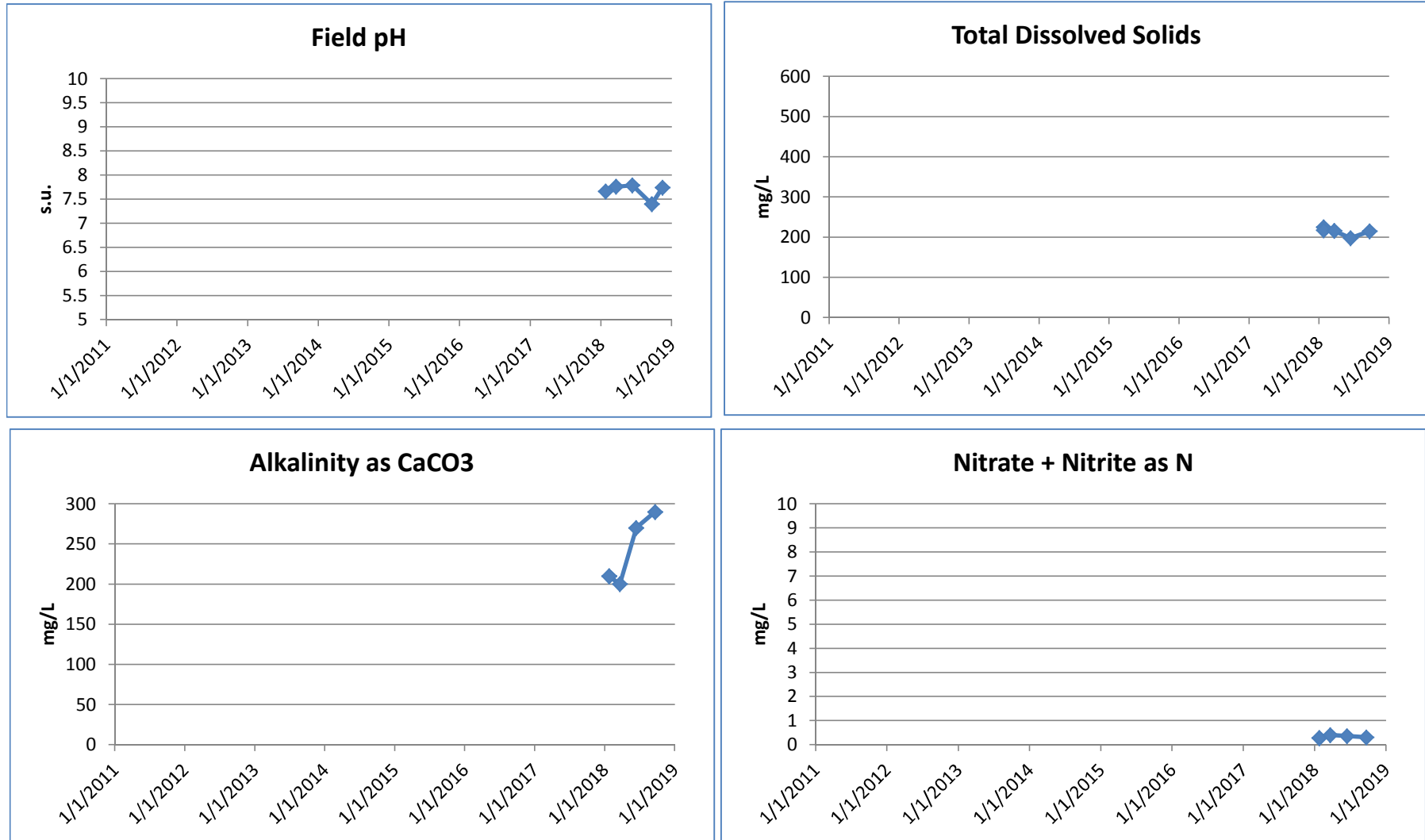
MW-19



MW-19



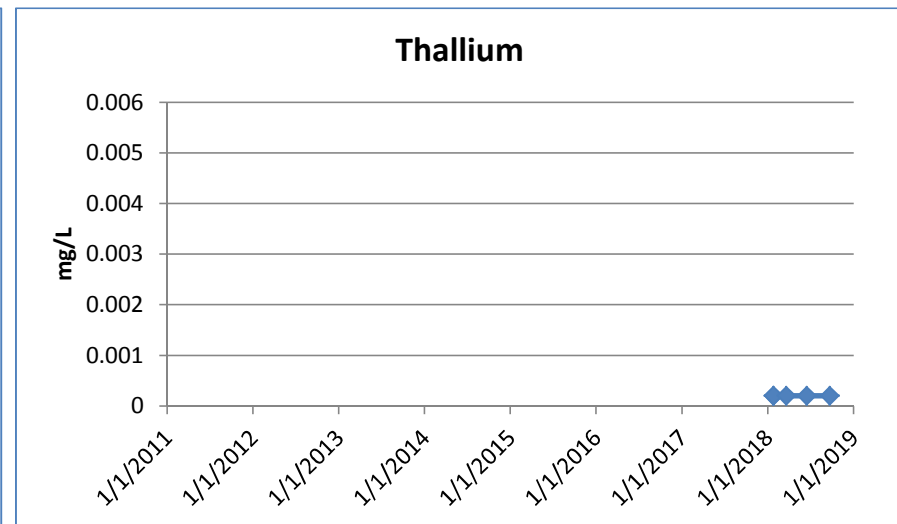
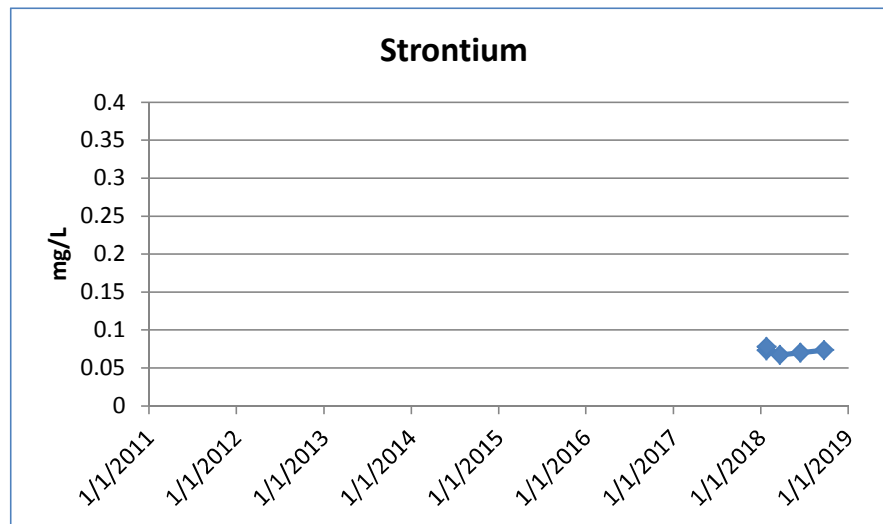
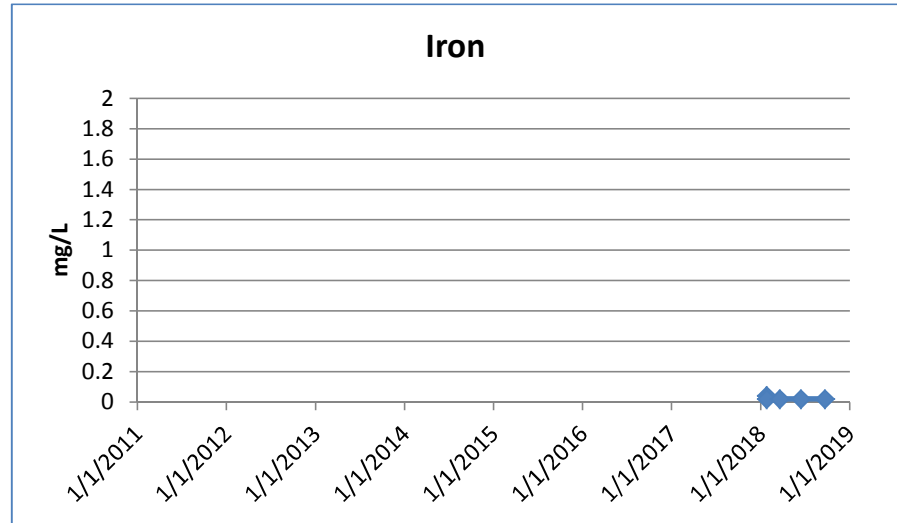
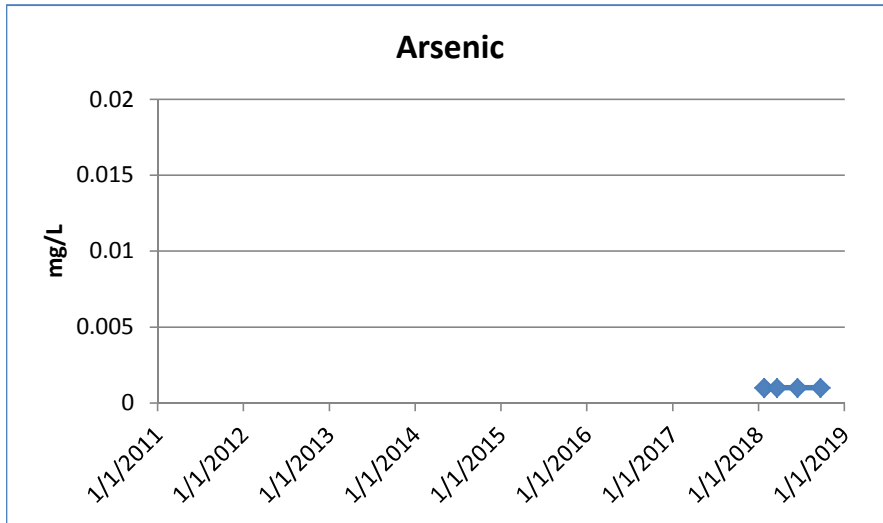
MW-20



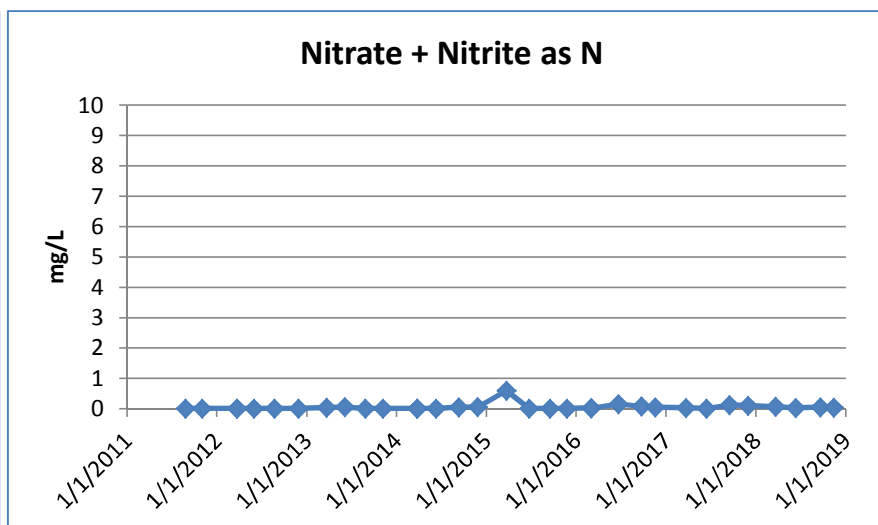
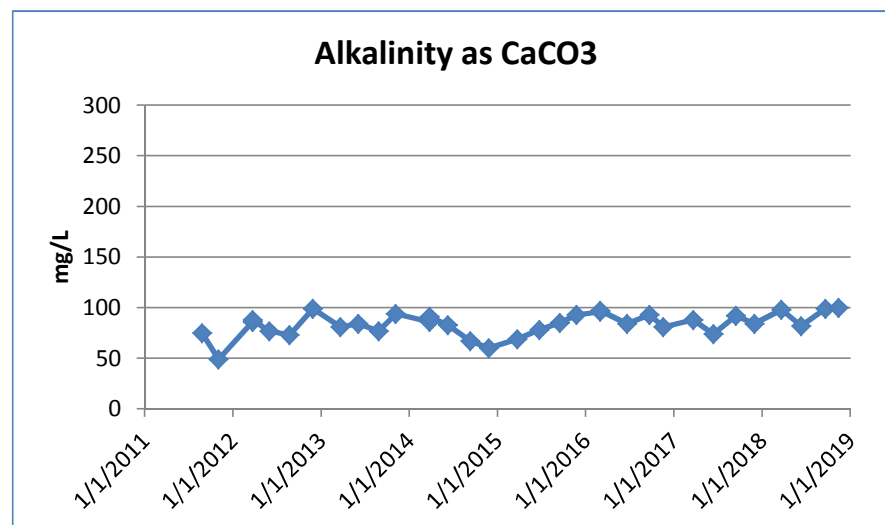
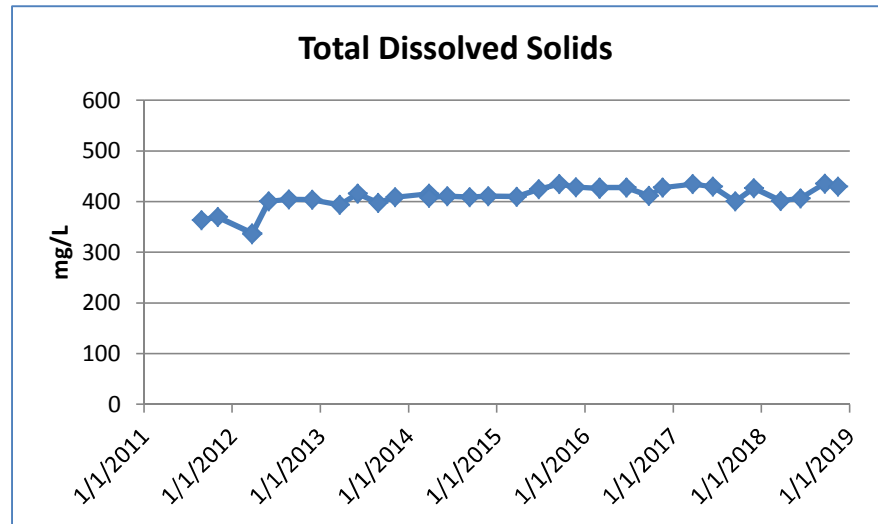
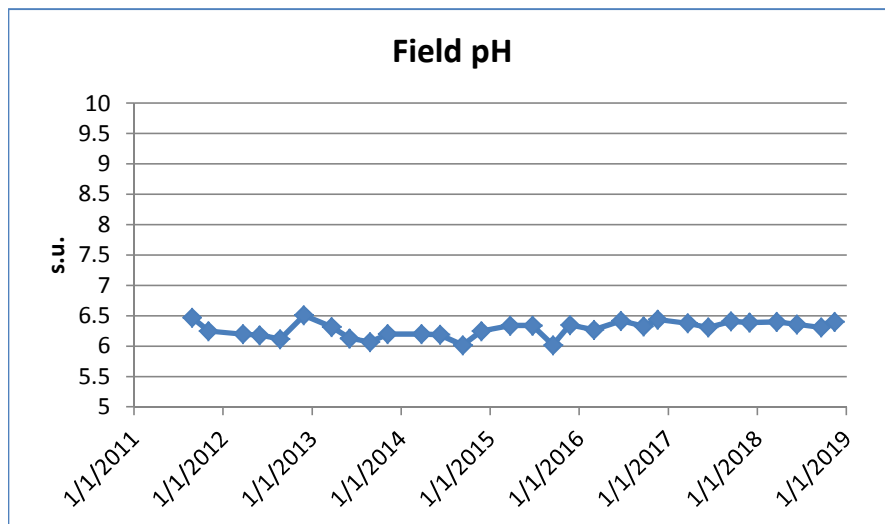
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**MW-20 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

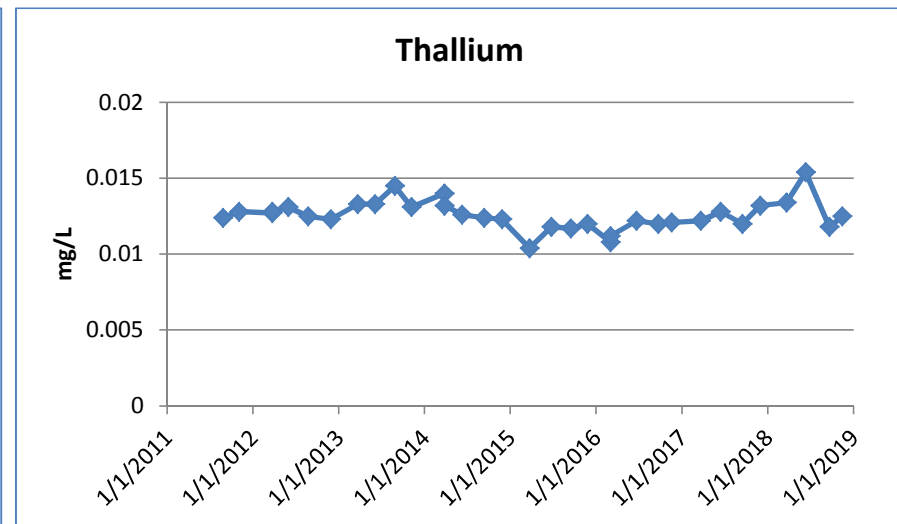
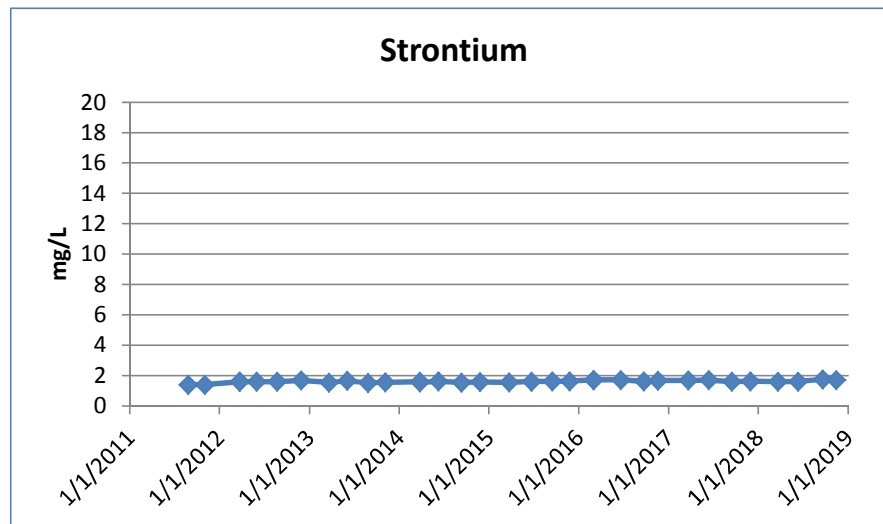
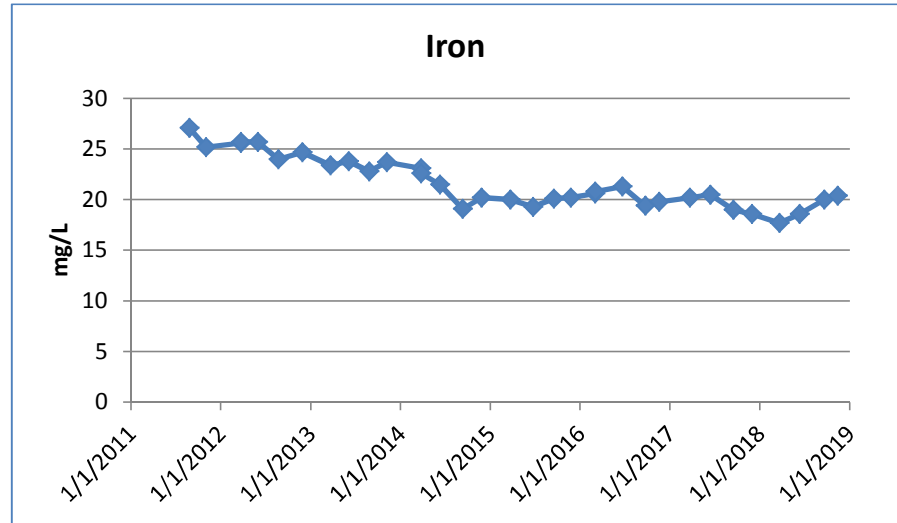
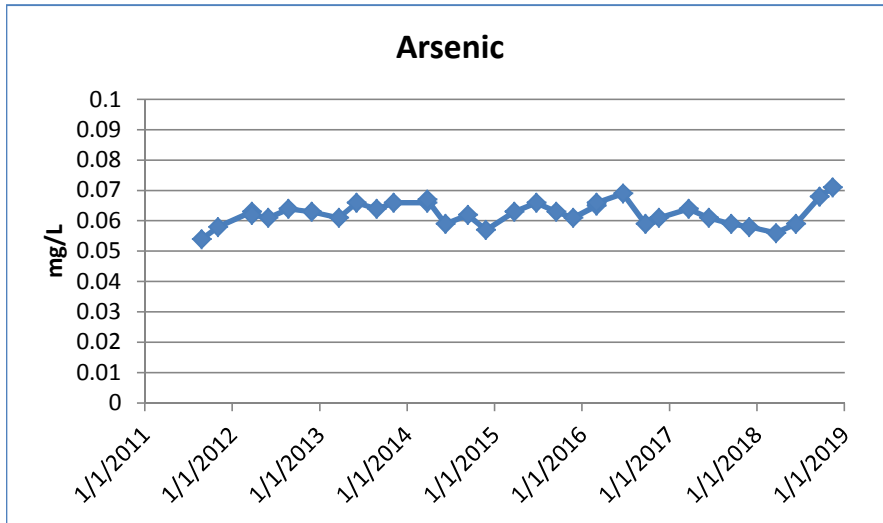
MW-20



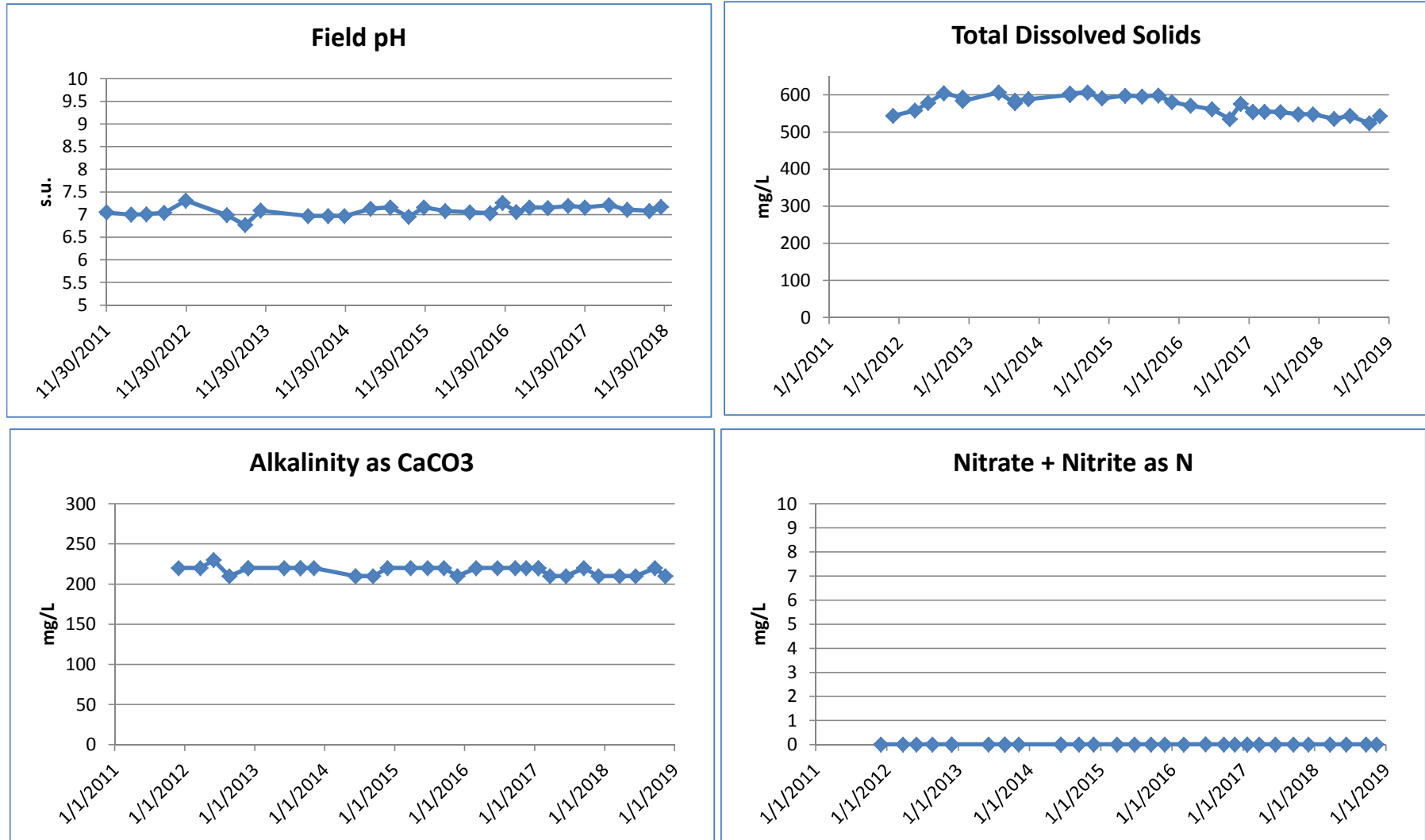
MW-1B



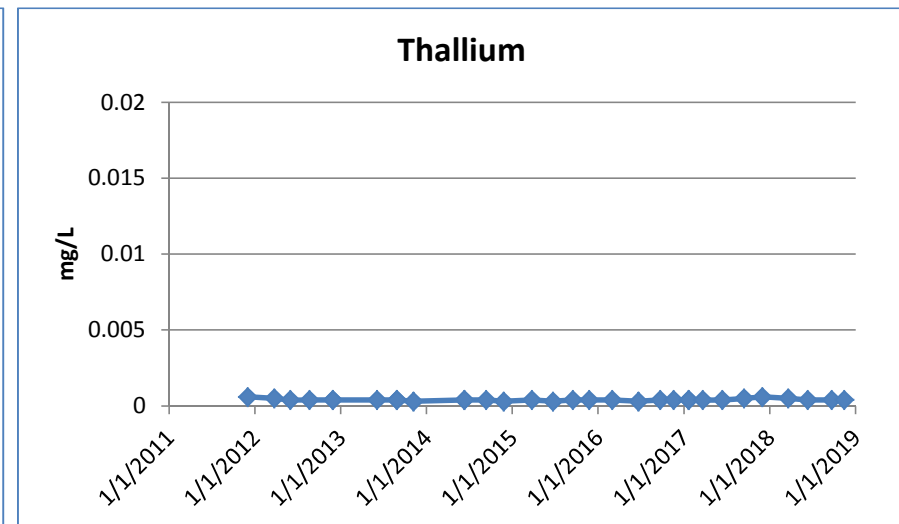
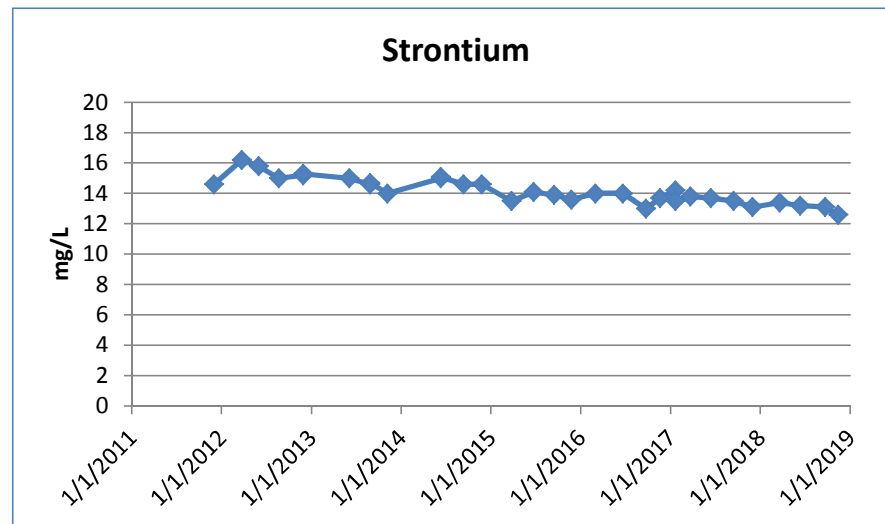
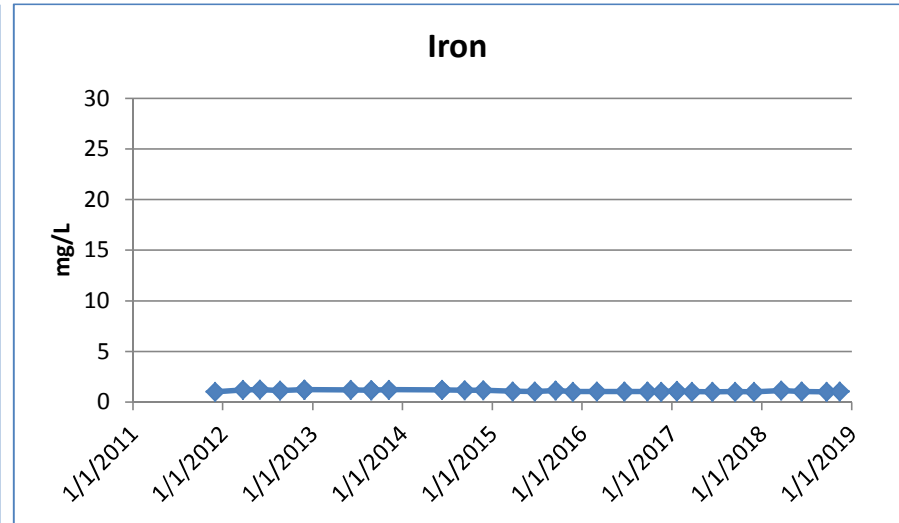
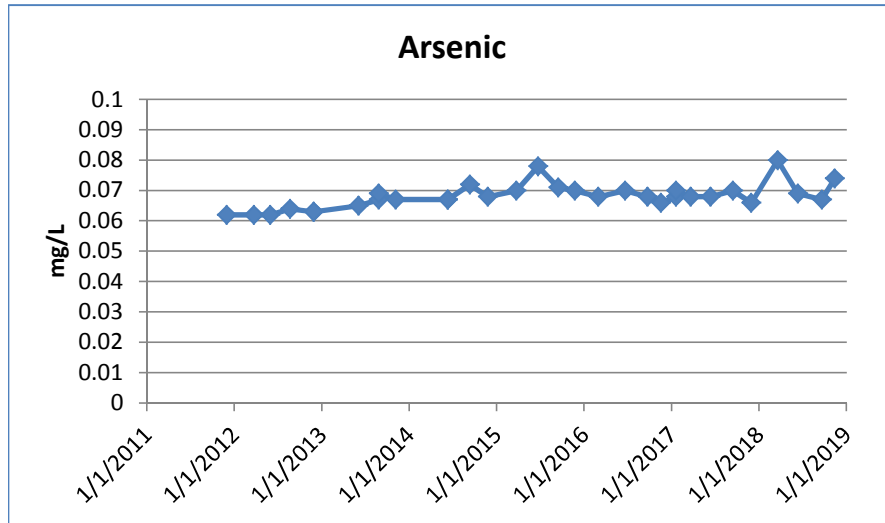
MW-1B



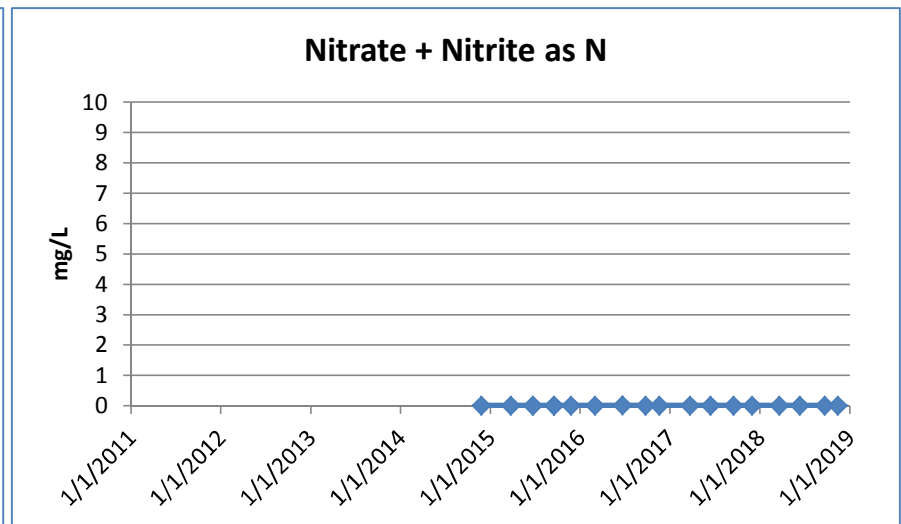
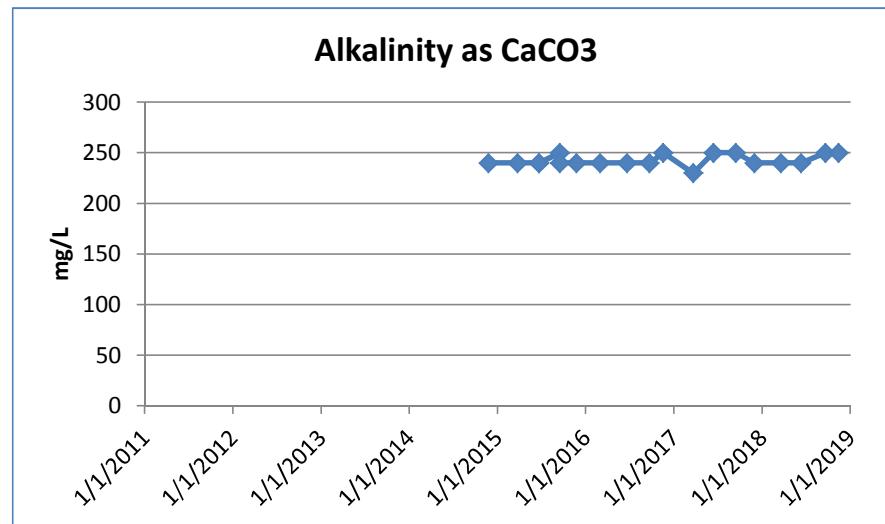
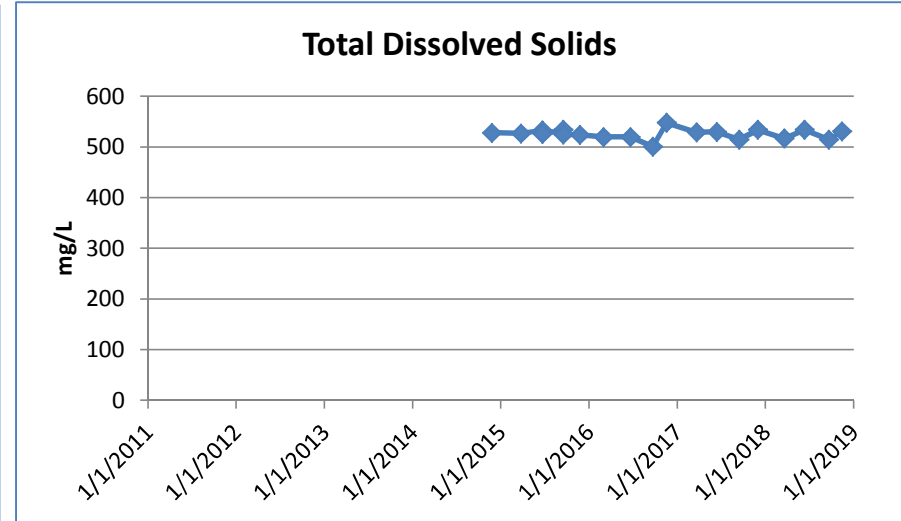
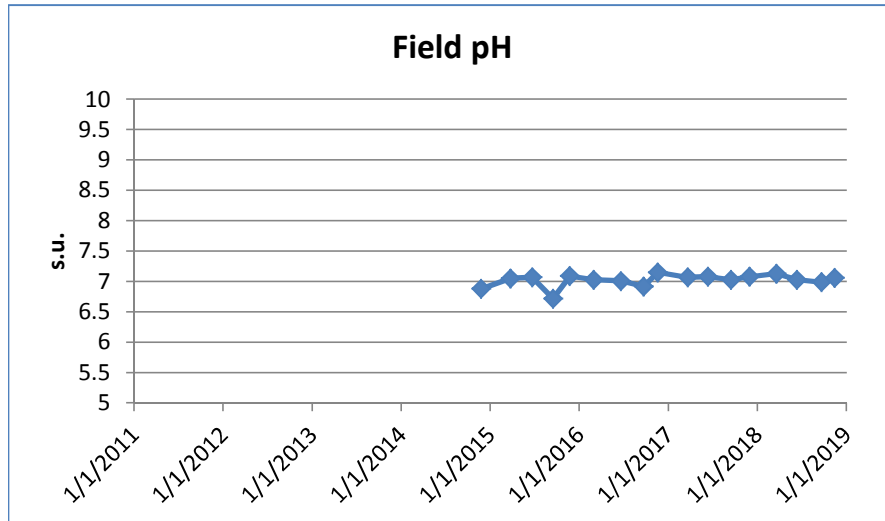
MW-3



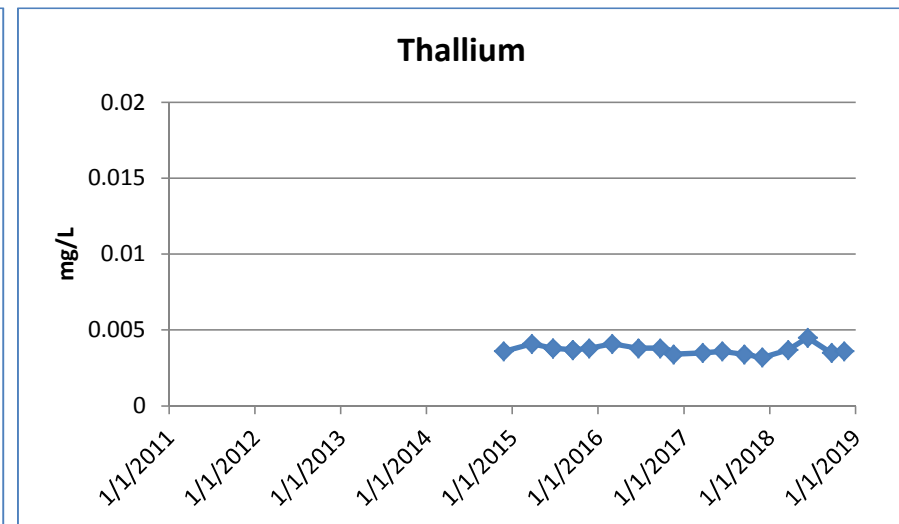
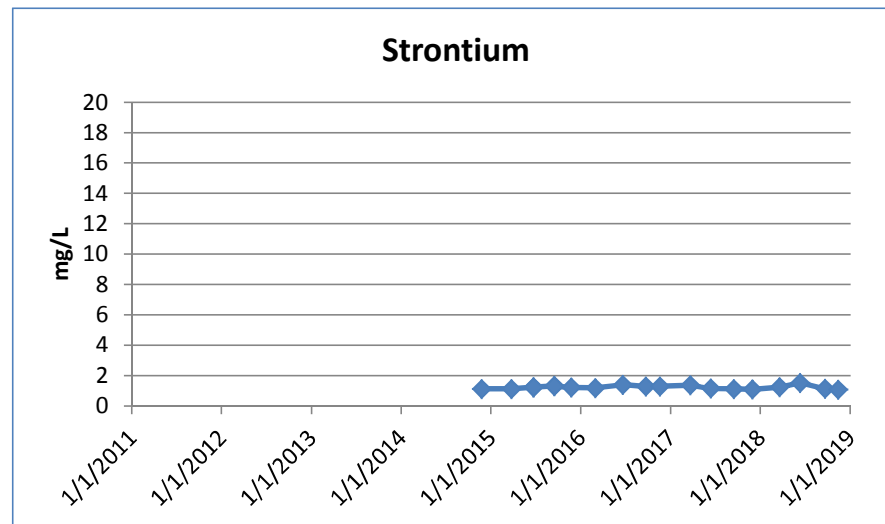
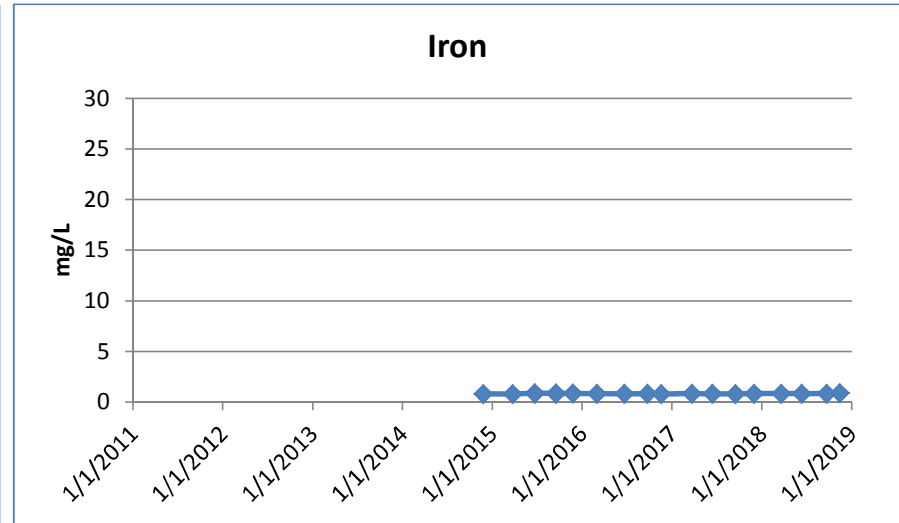
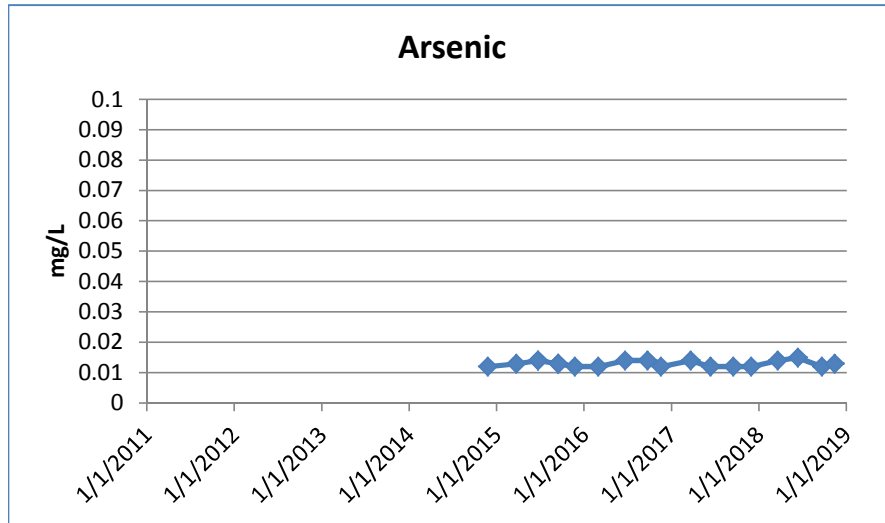
MW-3



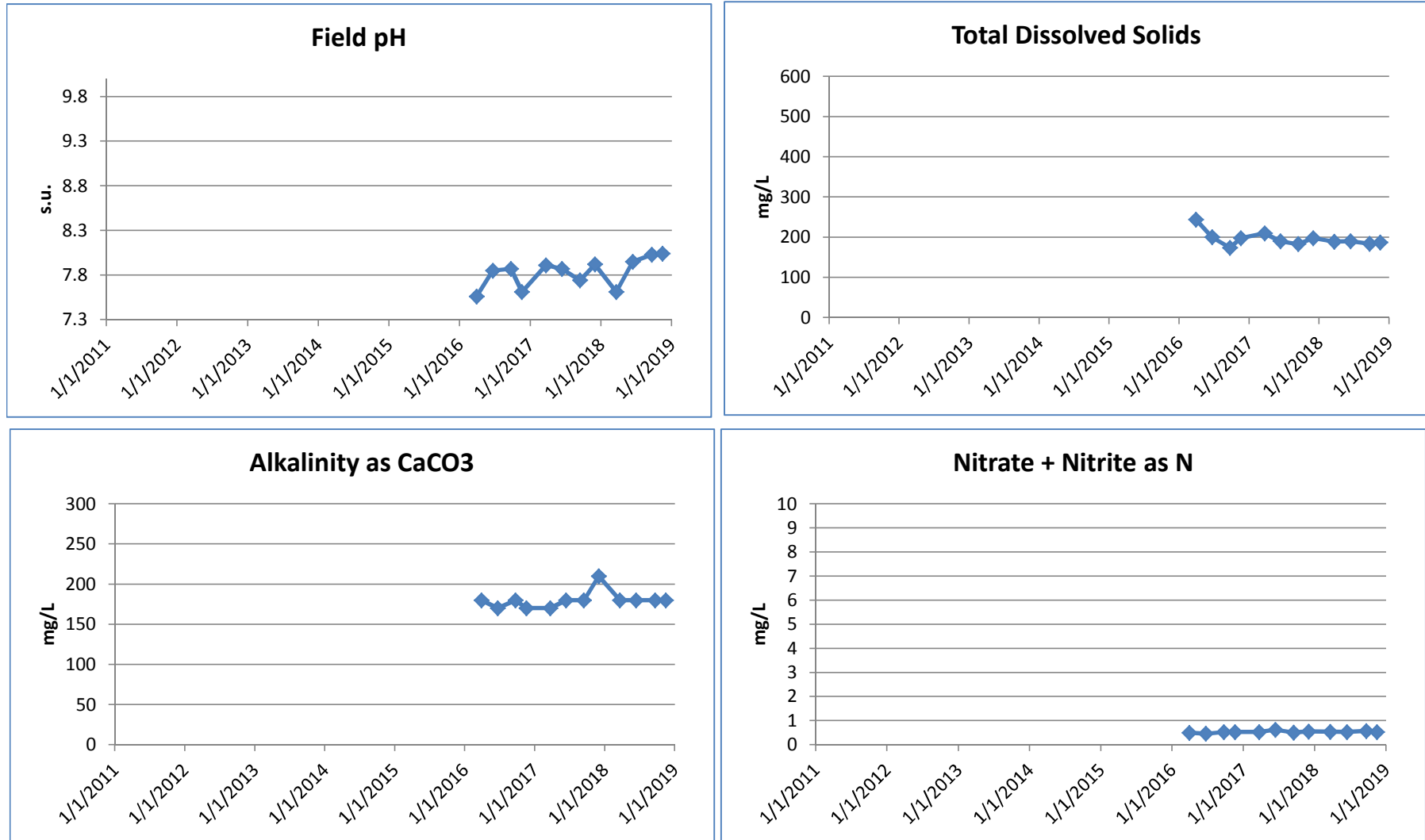
MW-9



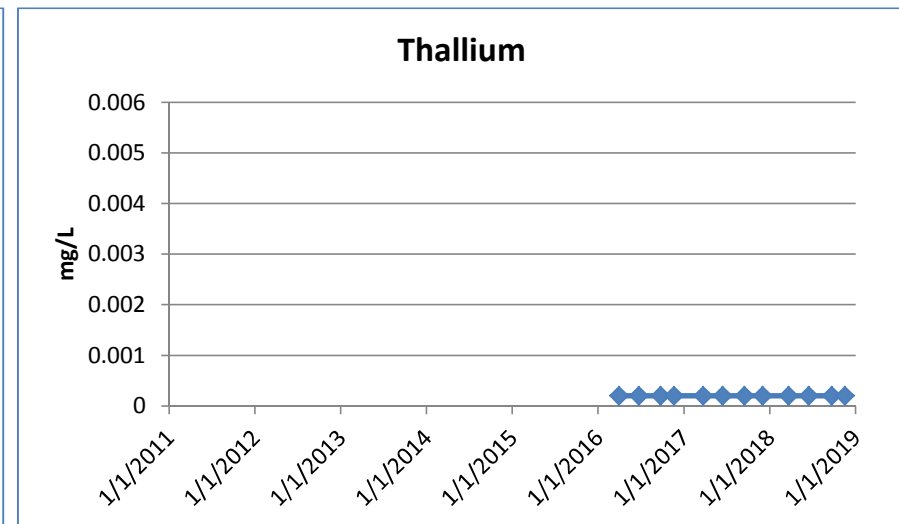
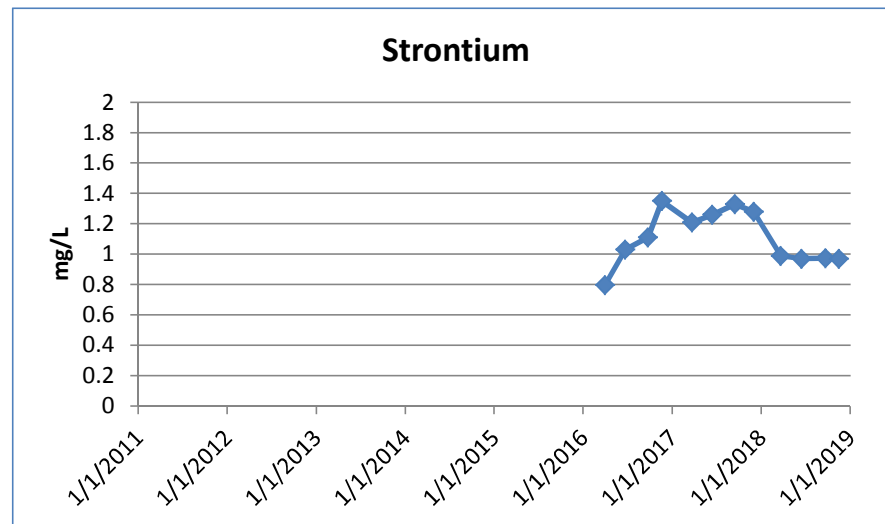
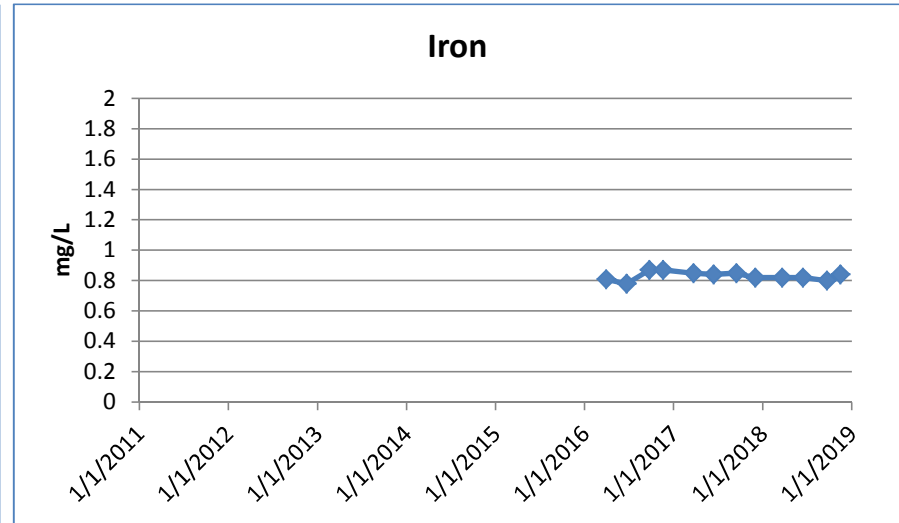
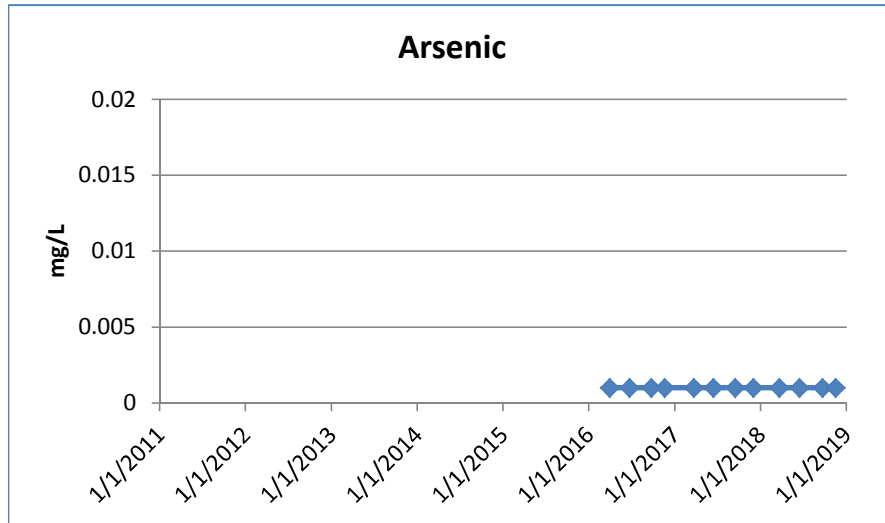
MW-9



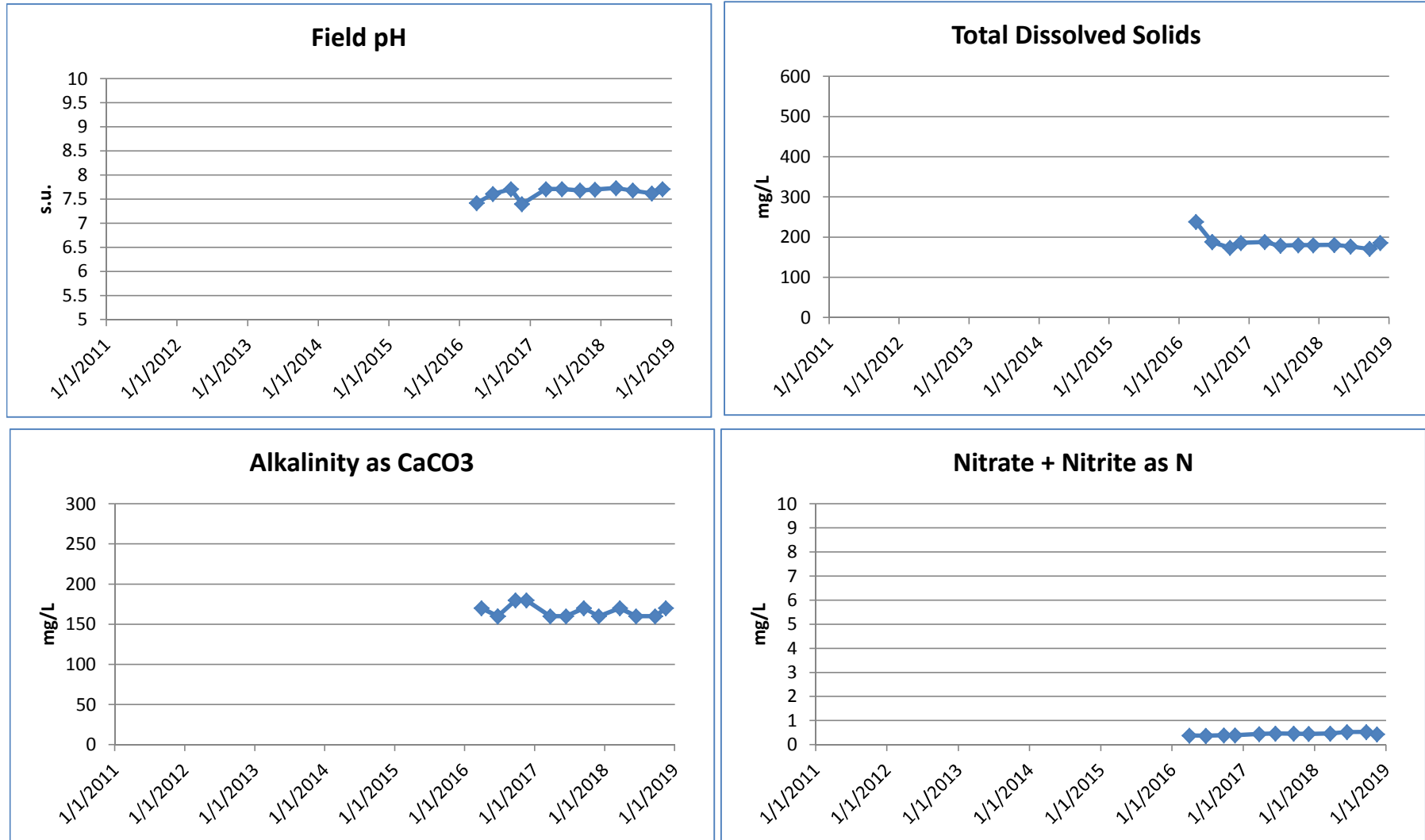
MW-10



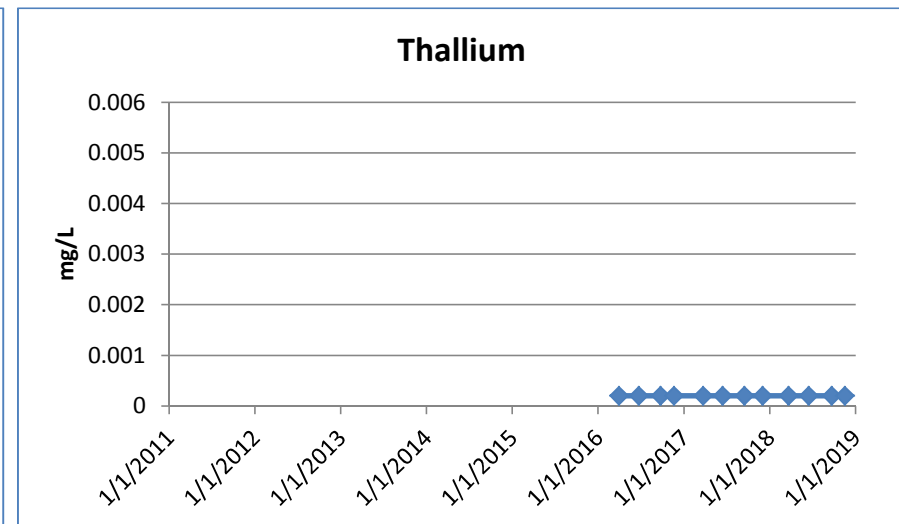
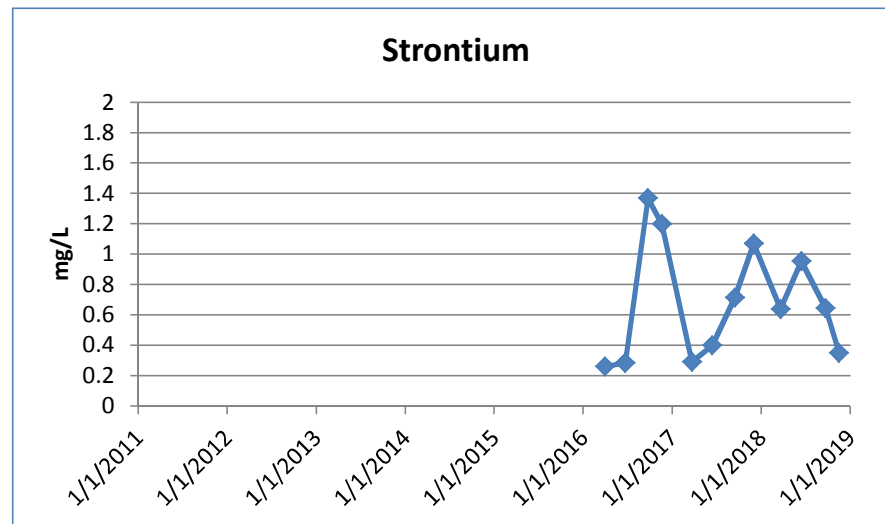
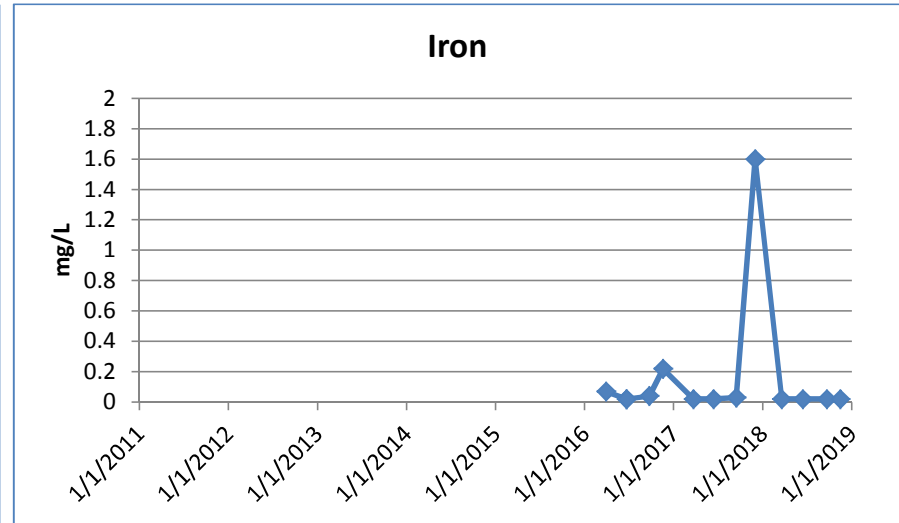
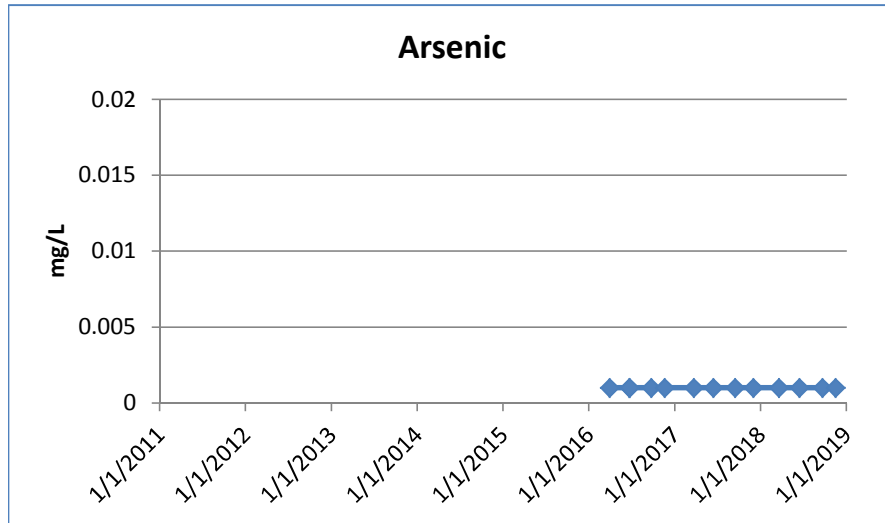
MW-10



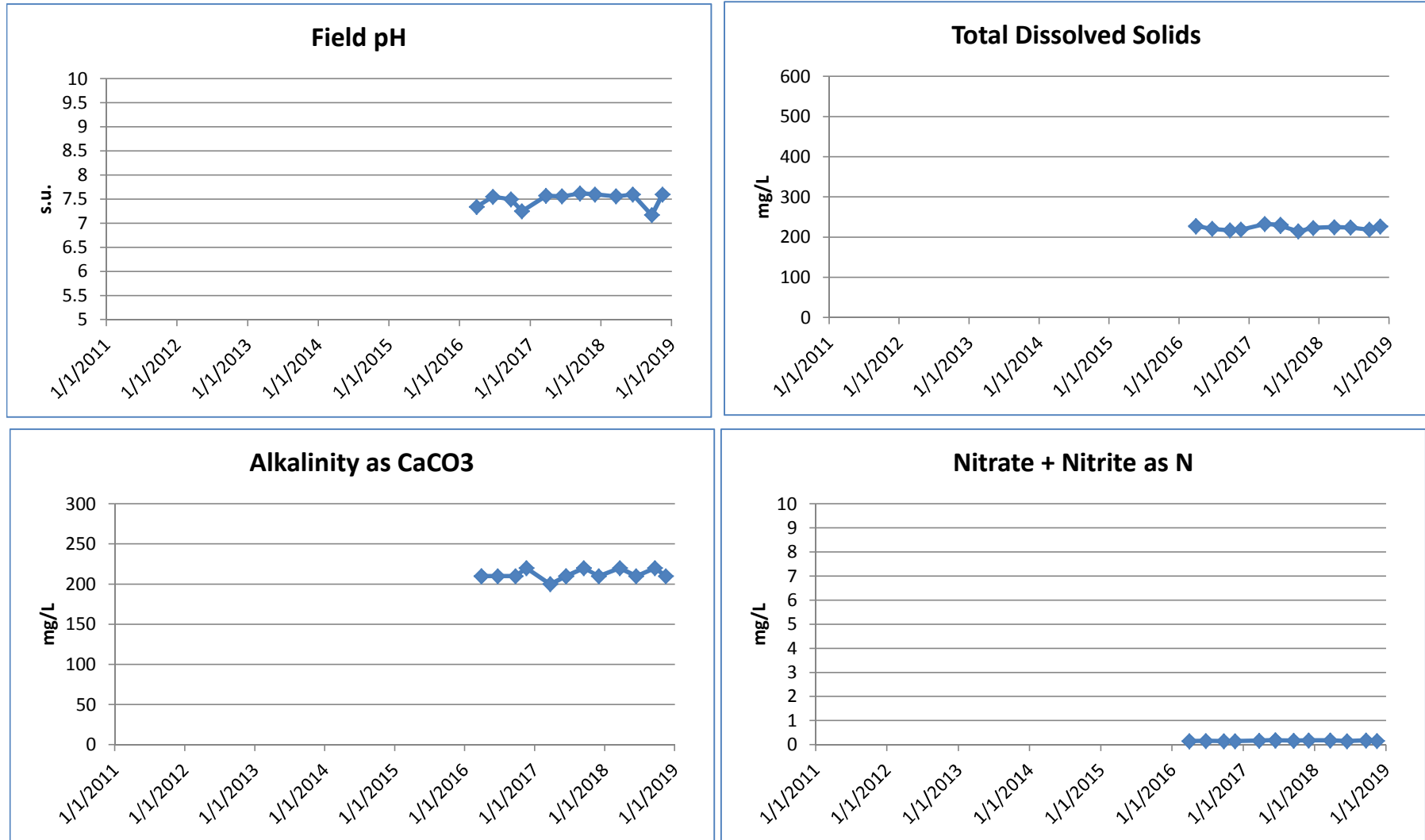
MW-11



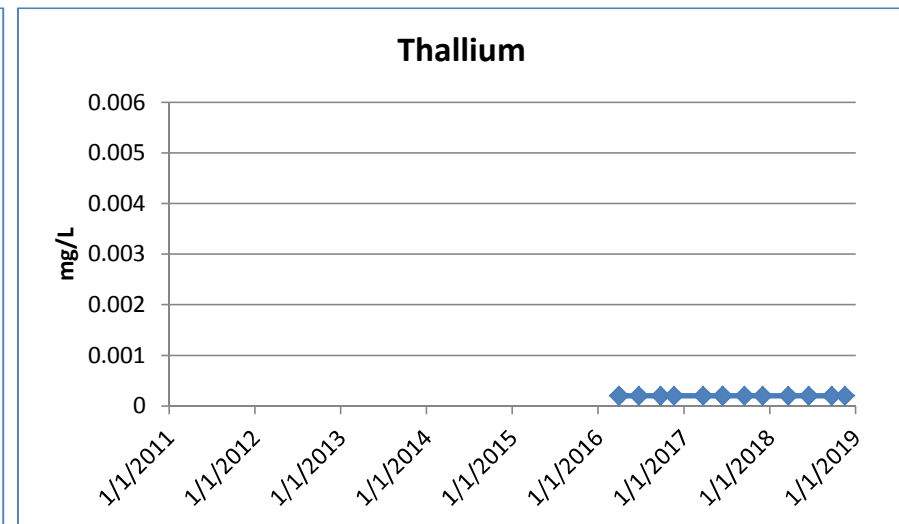
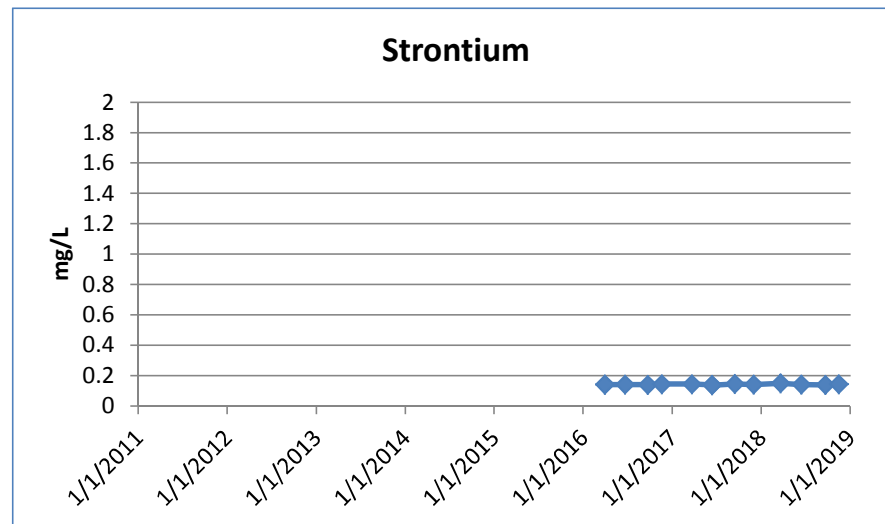
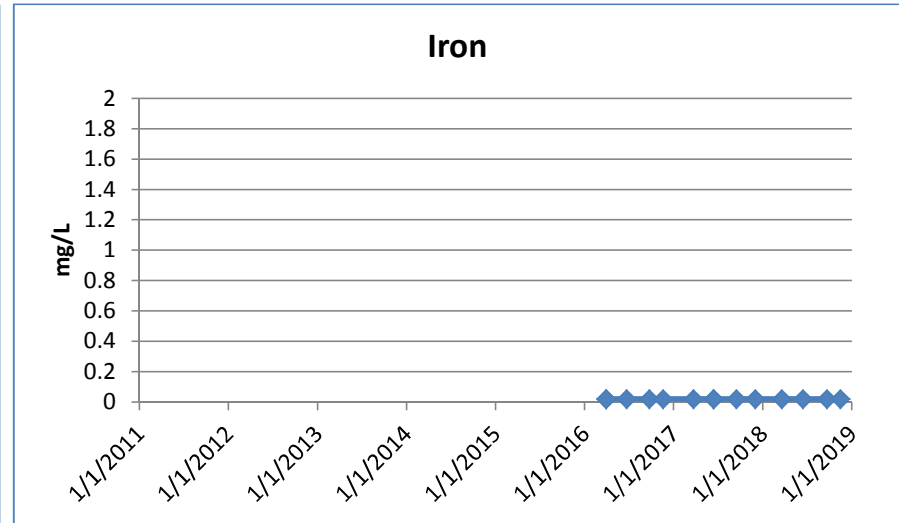
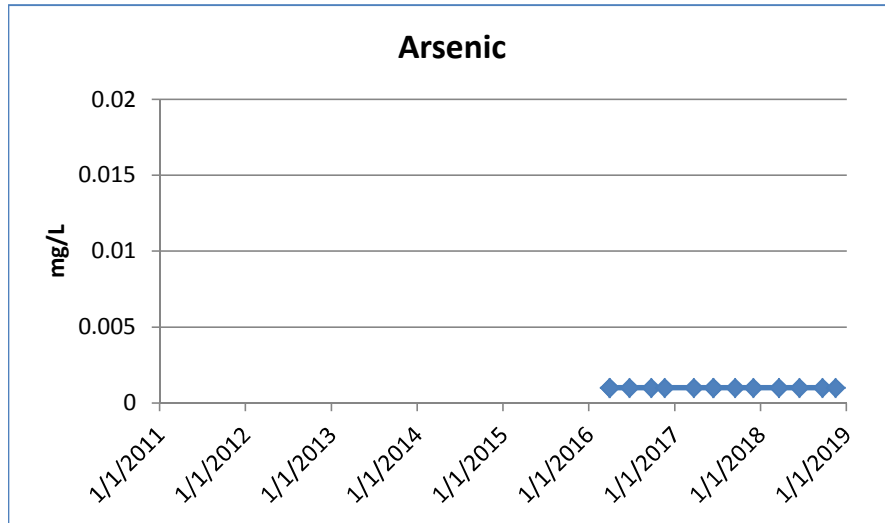
MW-11



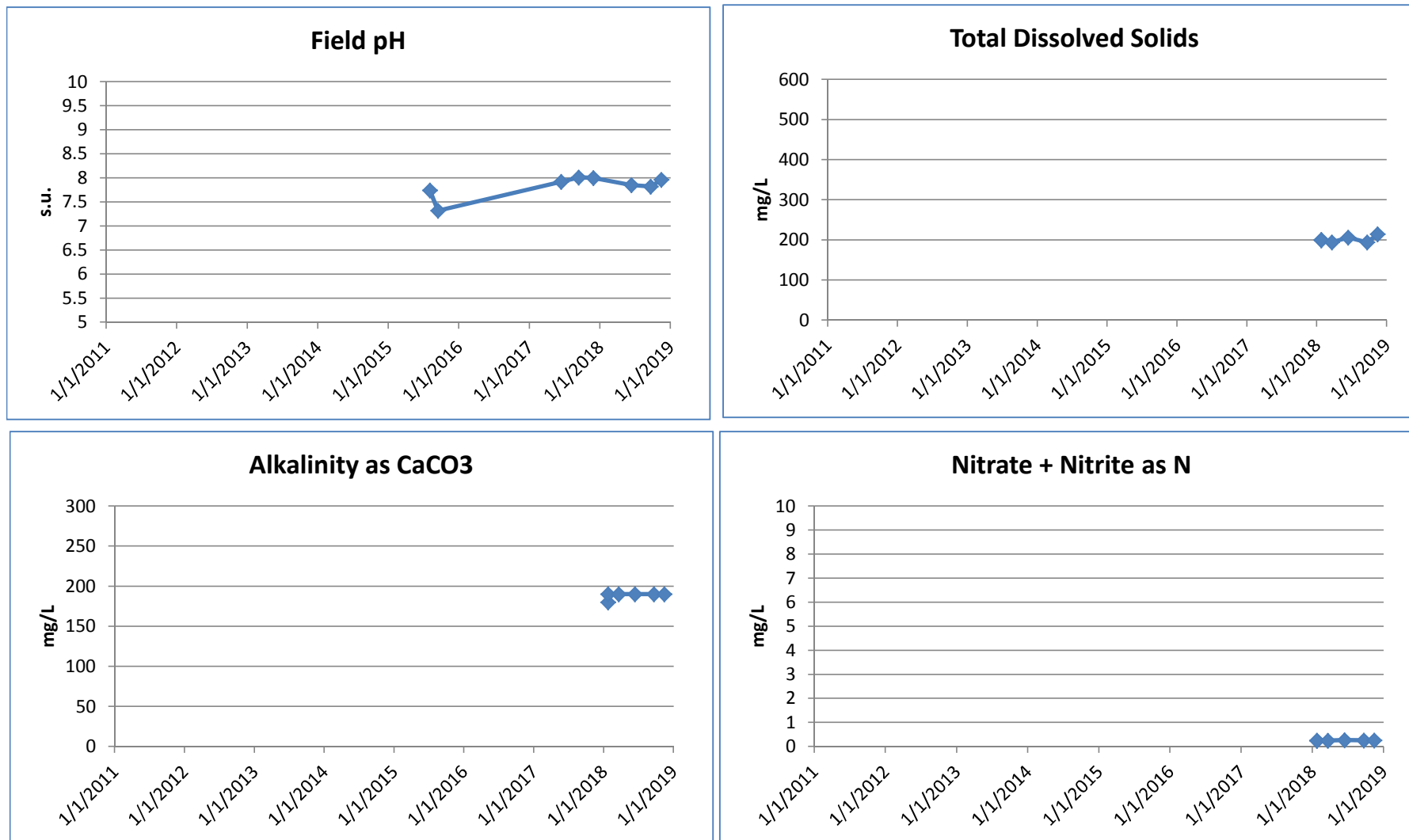
MW-12



MW-12



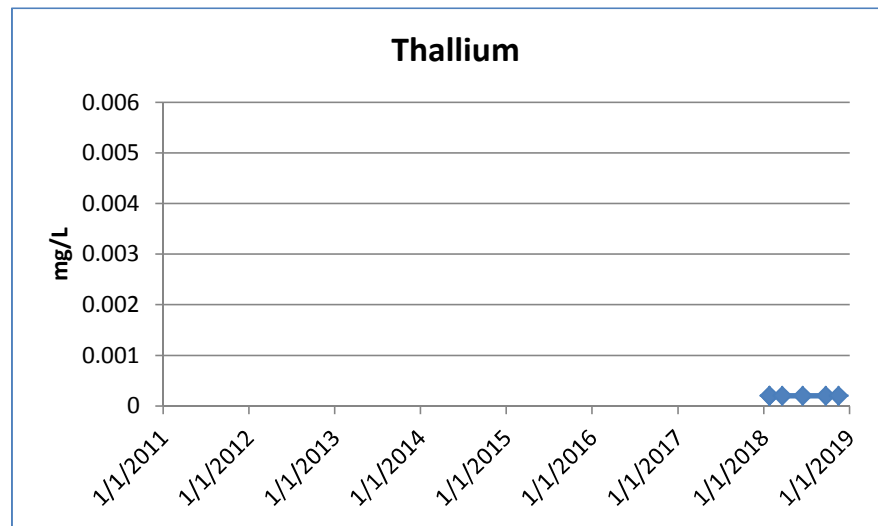
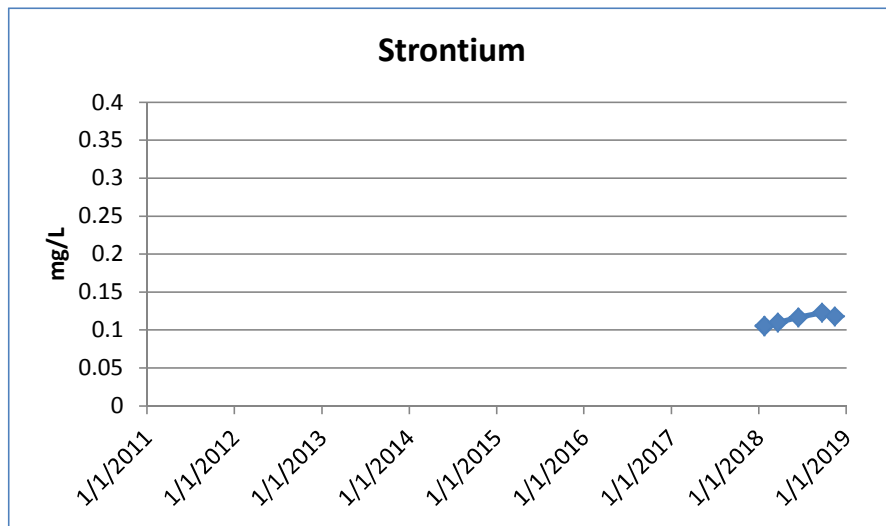
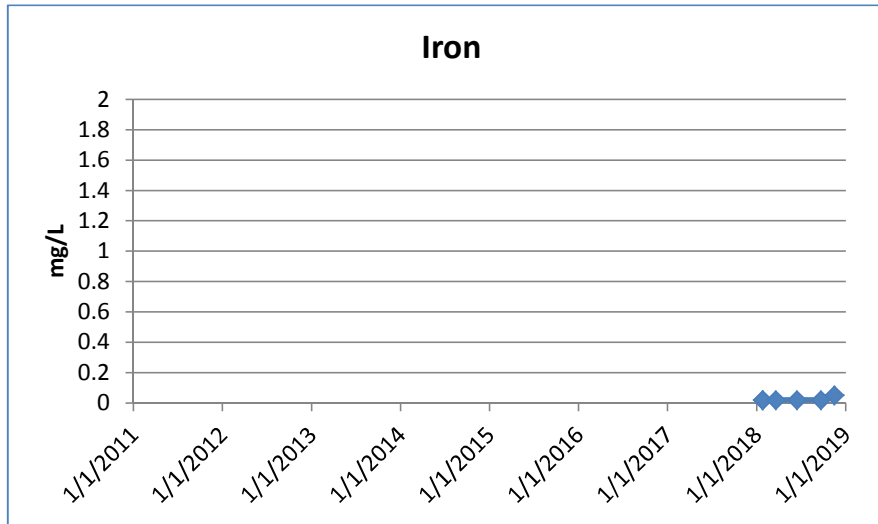
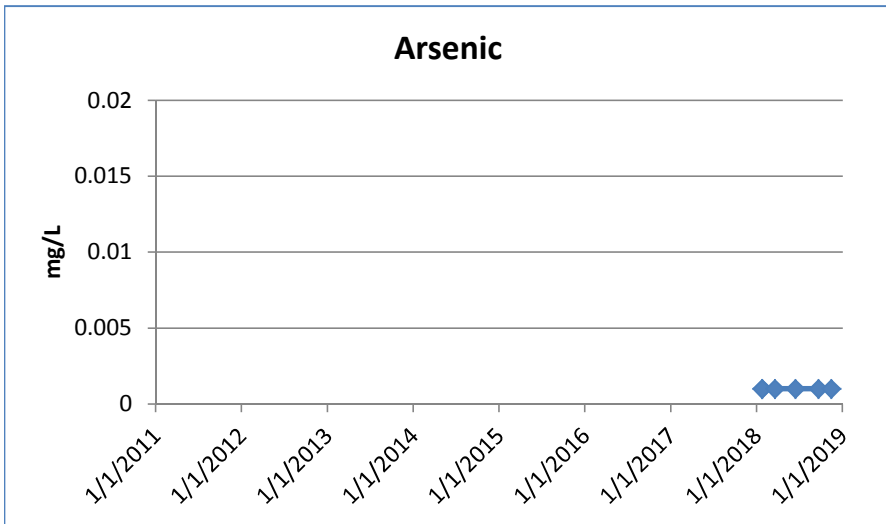
SC15-184



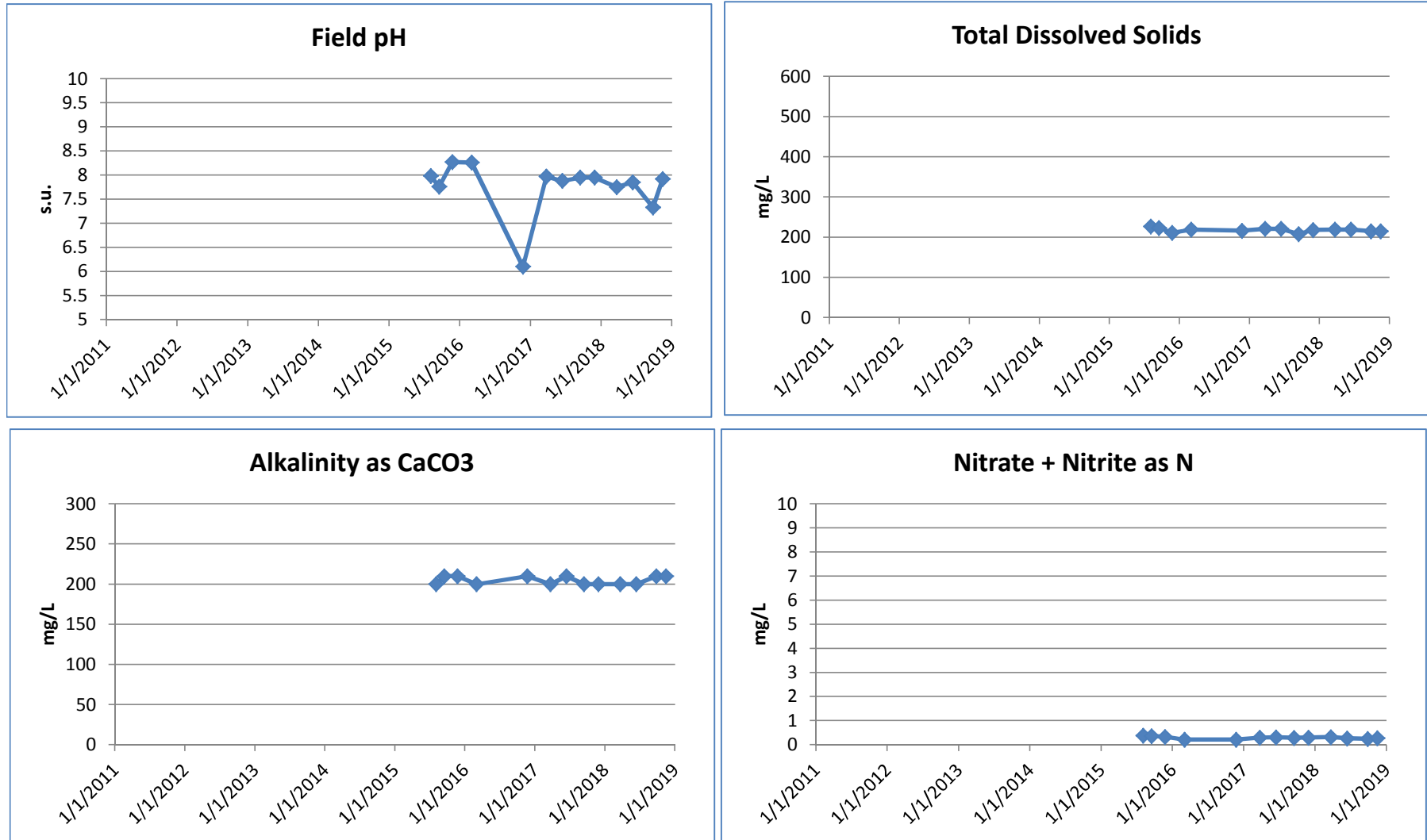
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SC15-184 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana

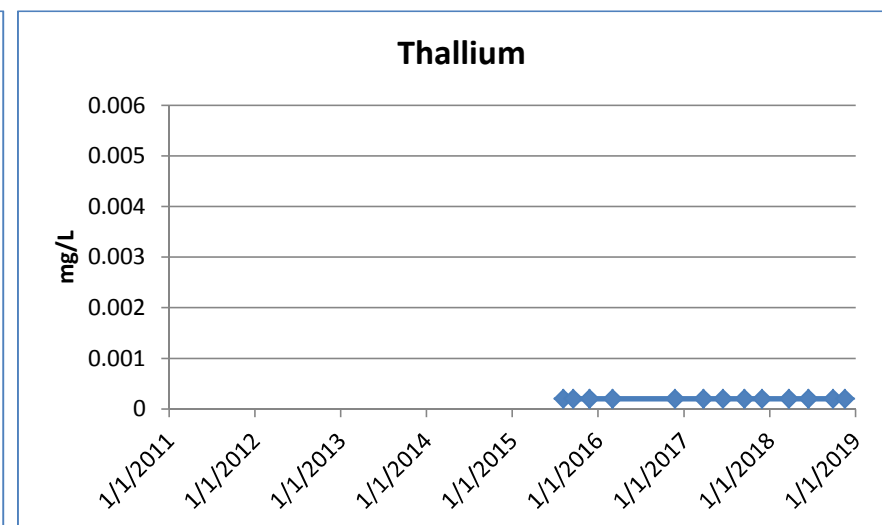
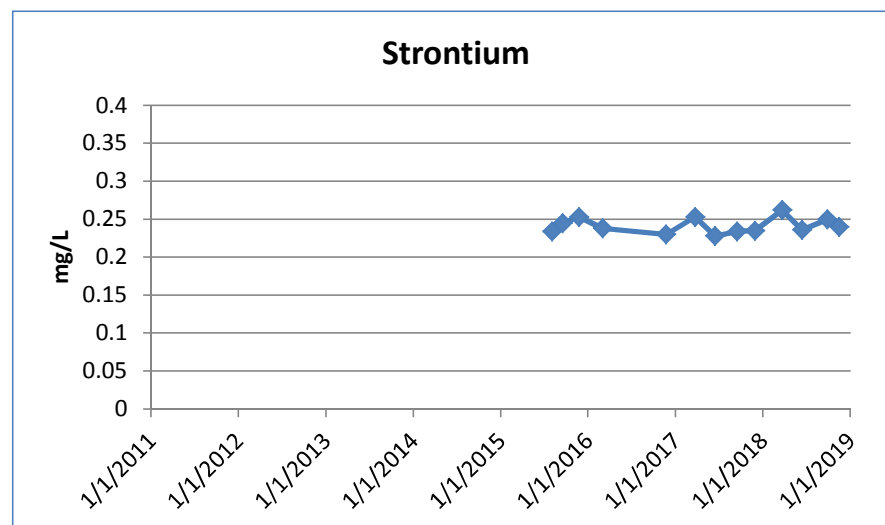
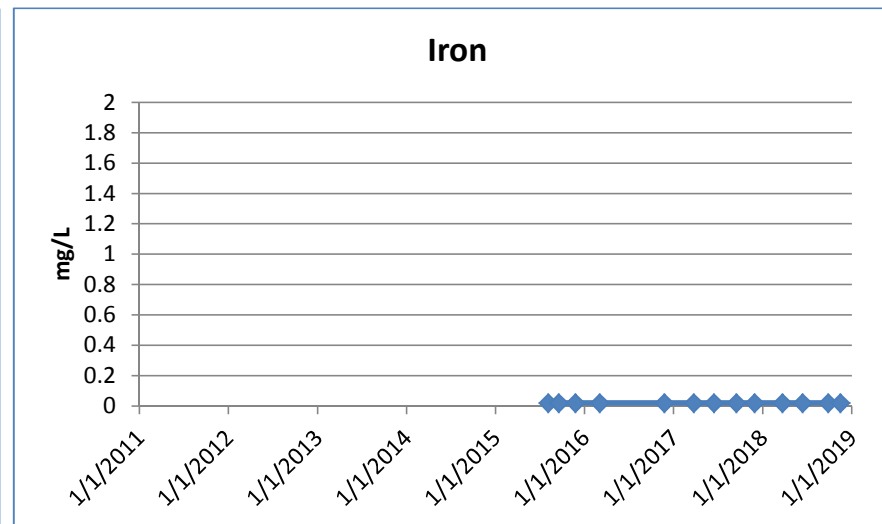
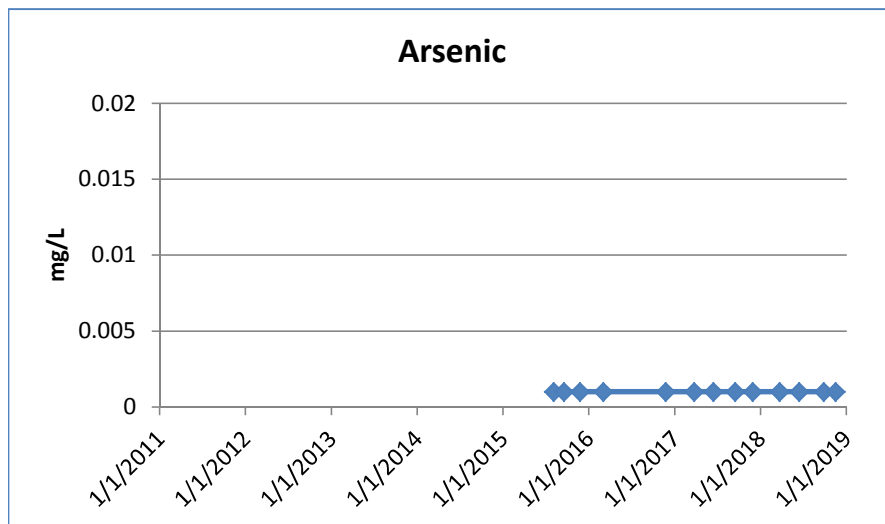
SC15-184



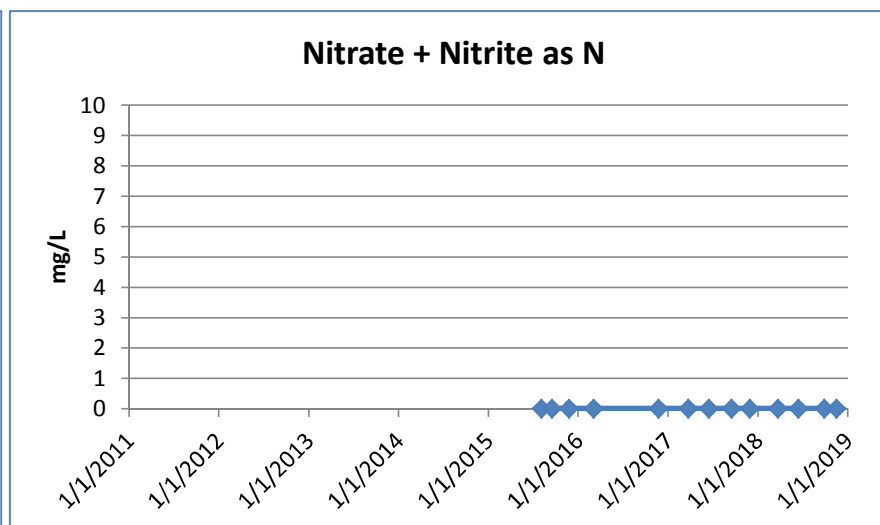
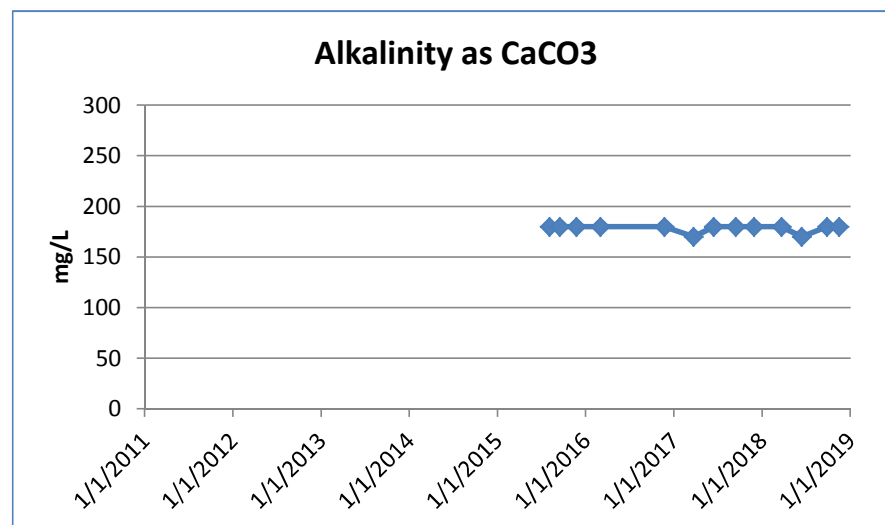
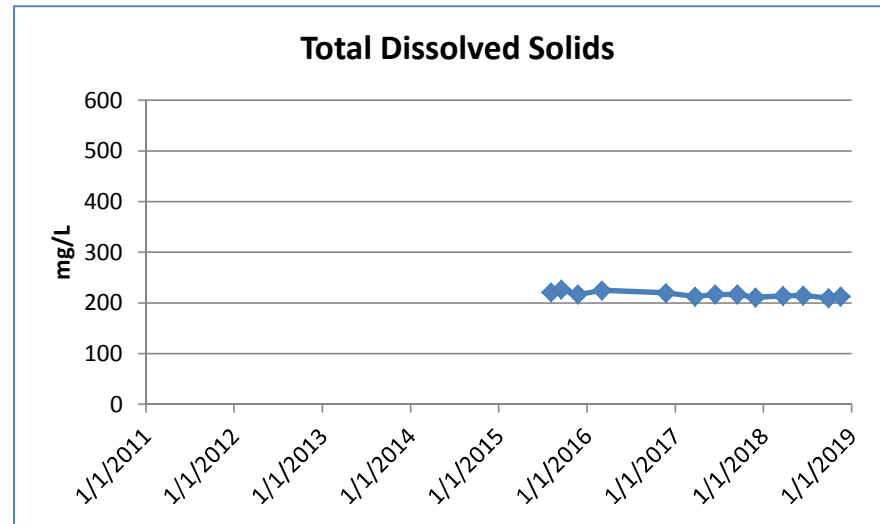
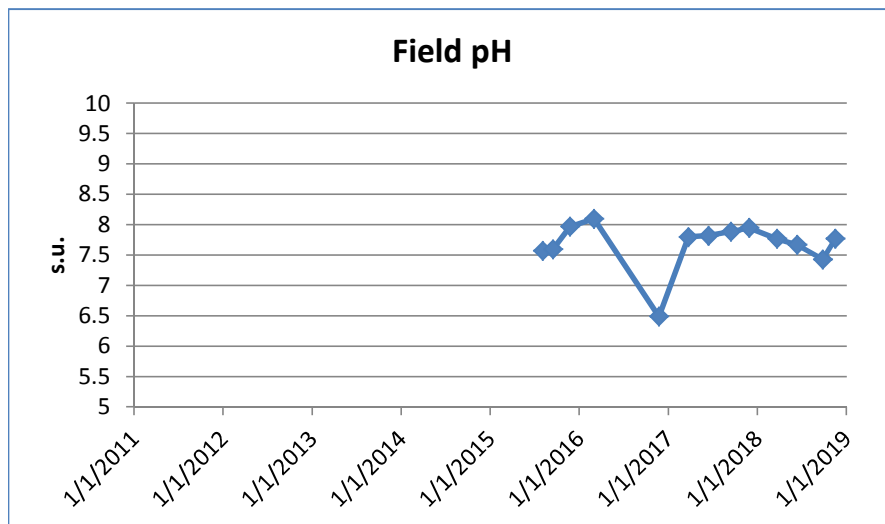
SC15-185



SC15-185



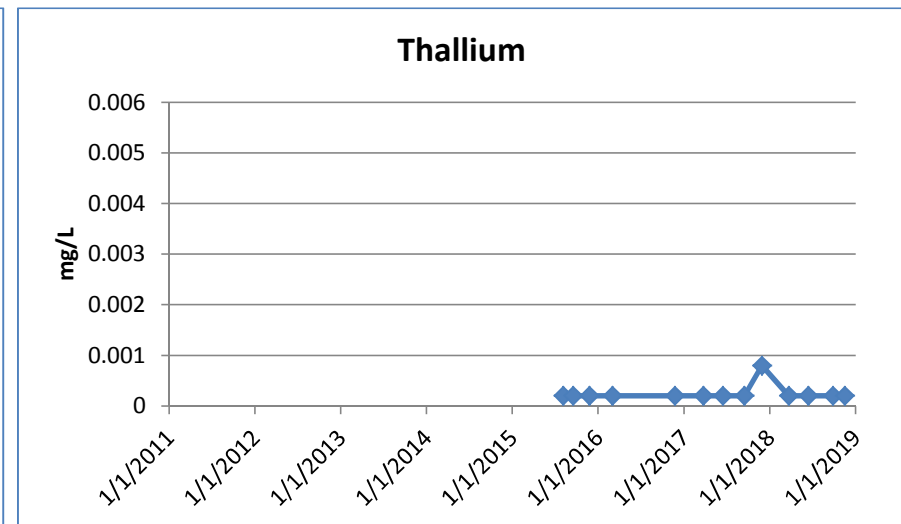
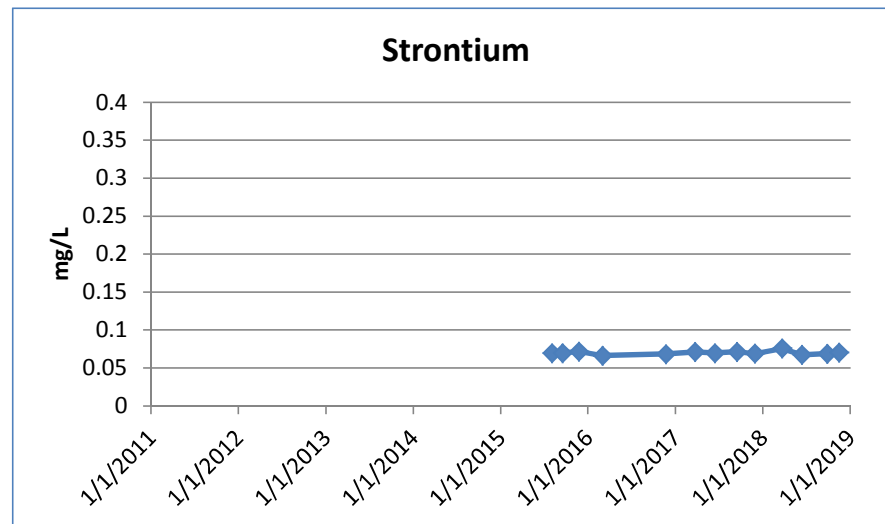
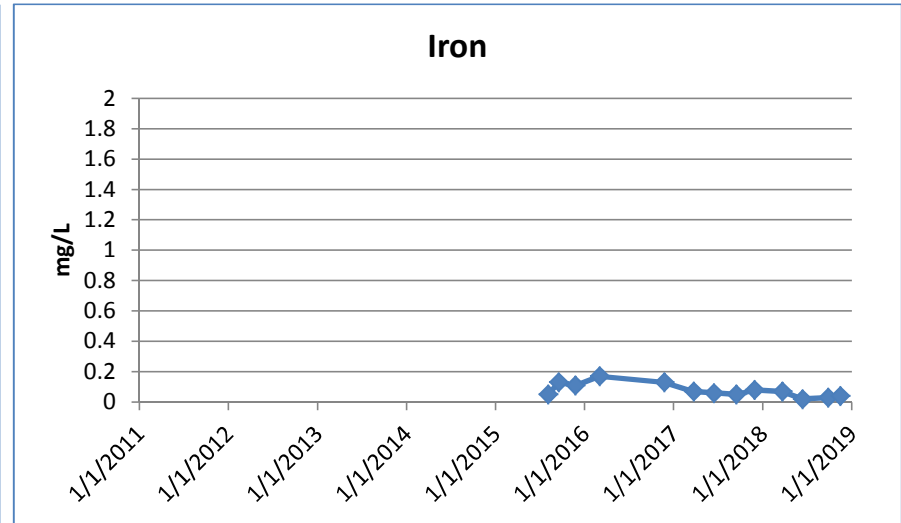
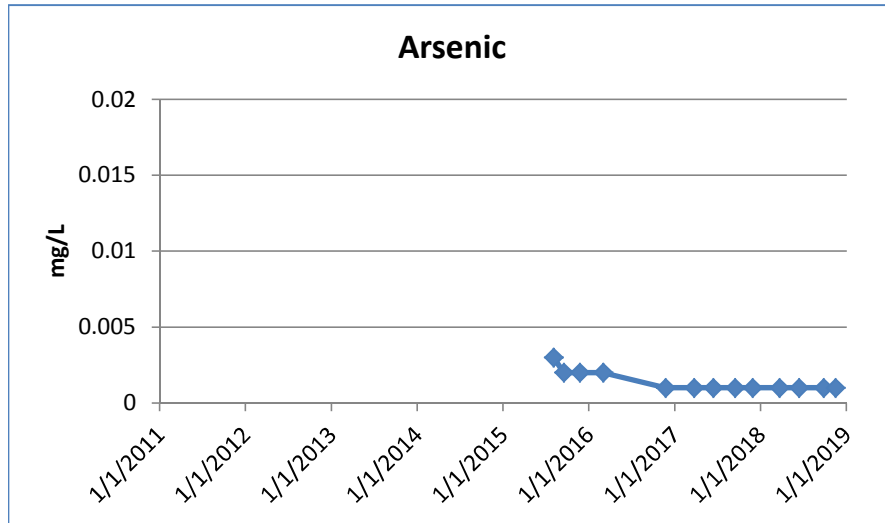
SC15-194



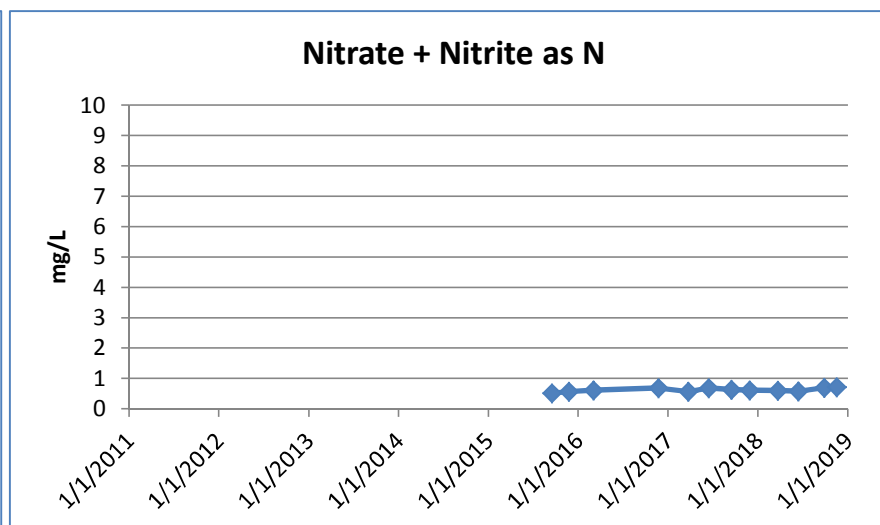
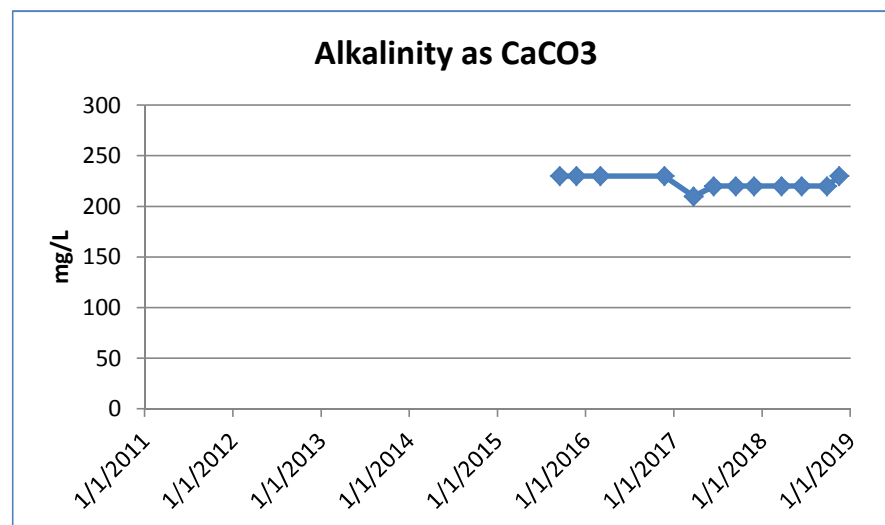
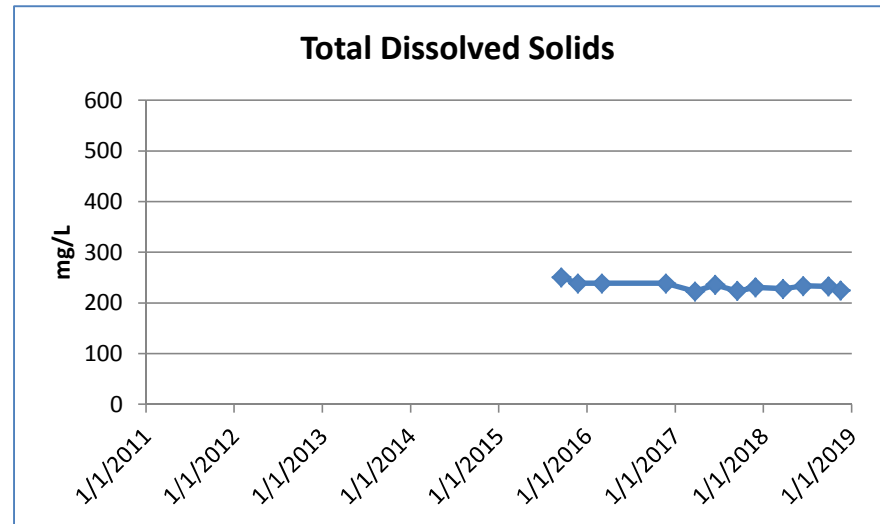
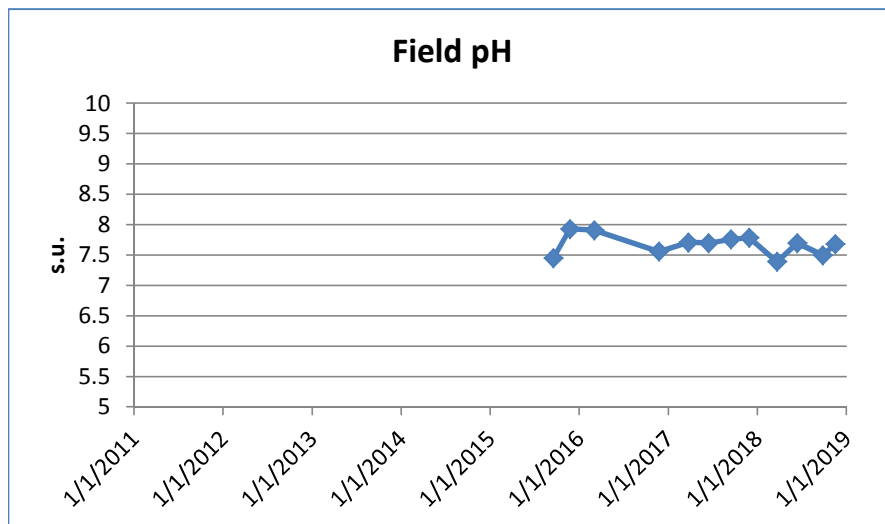
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SC15-194 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana

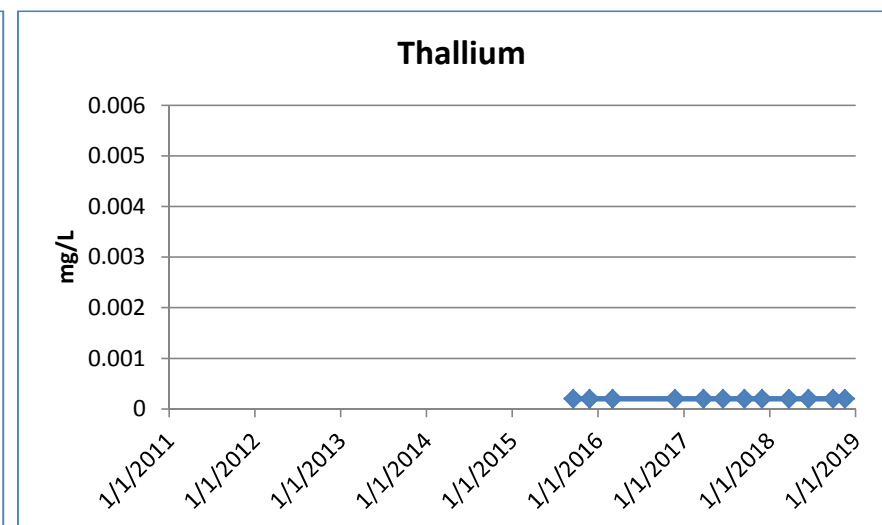
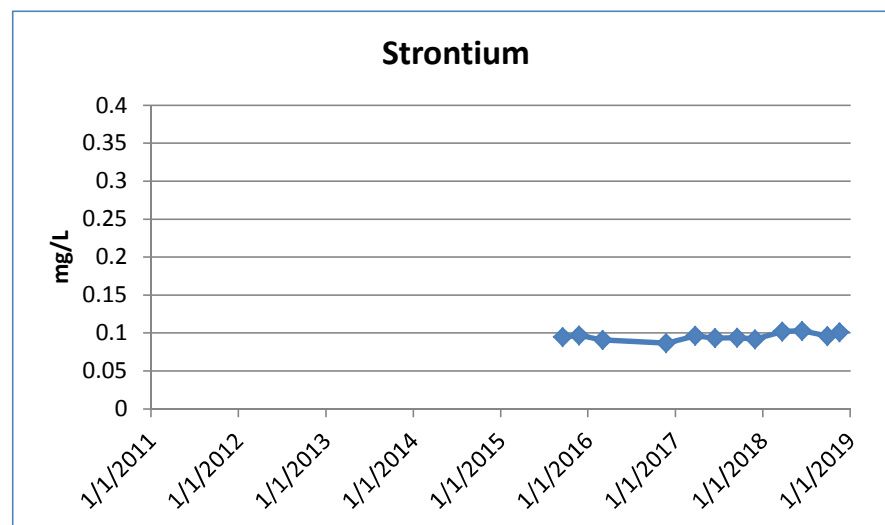
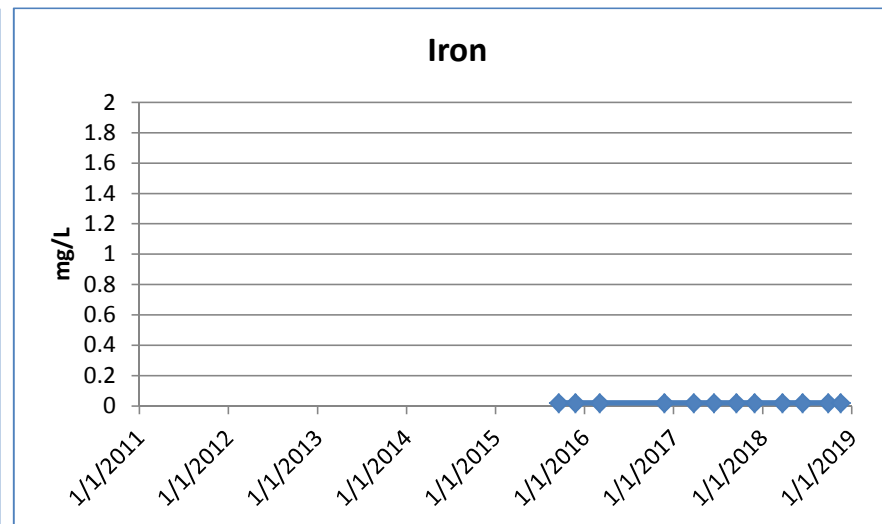
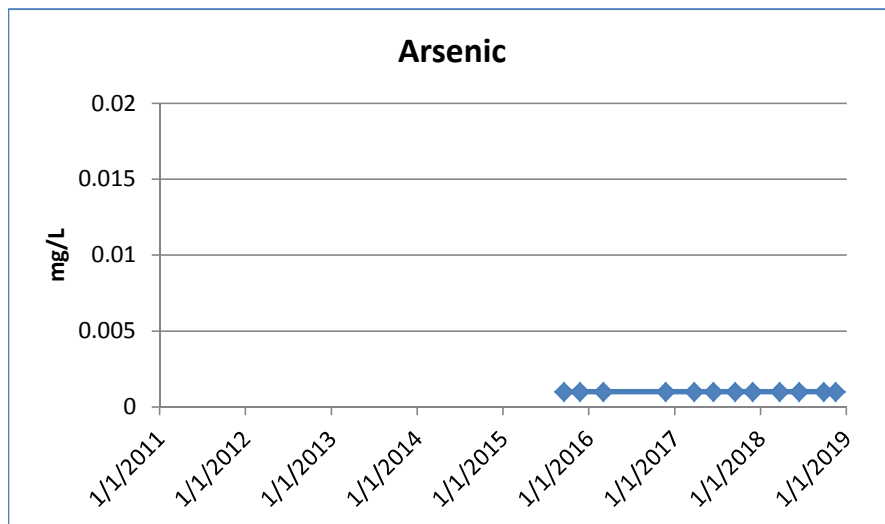
SC15-194



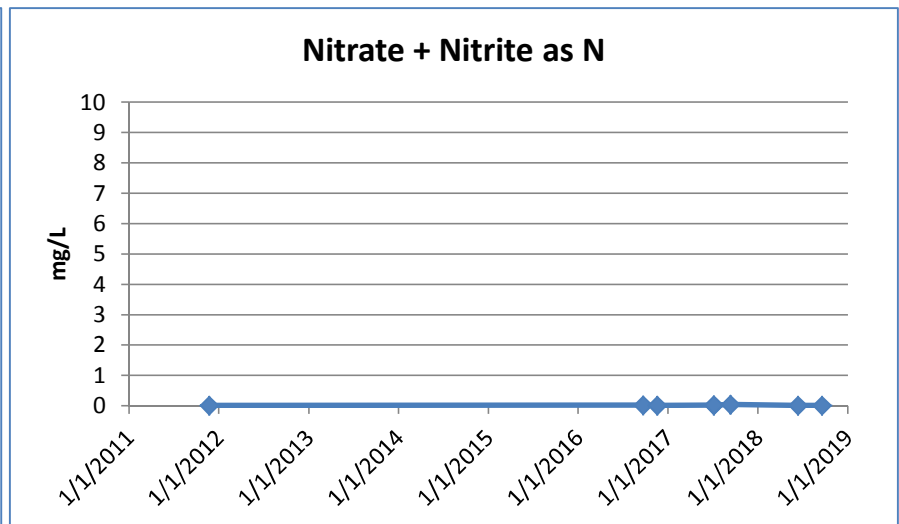
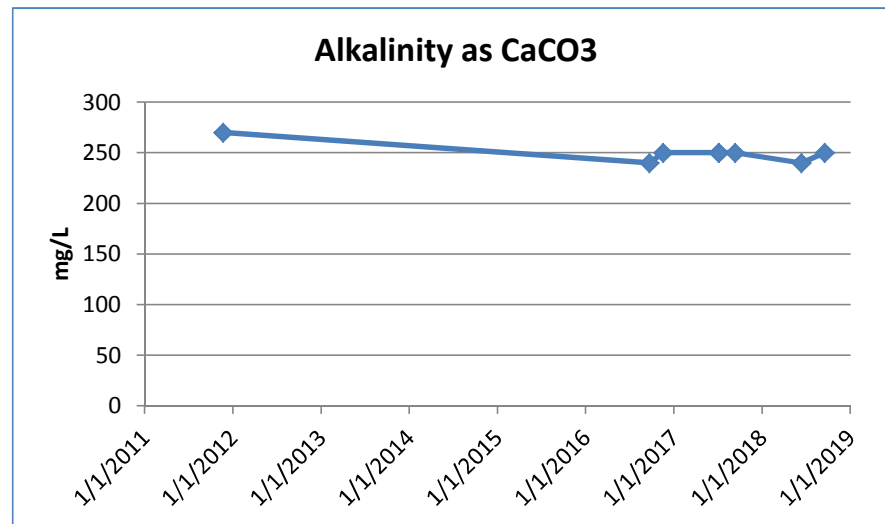
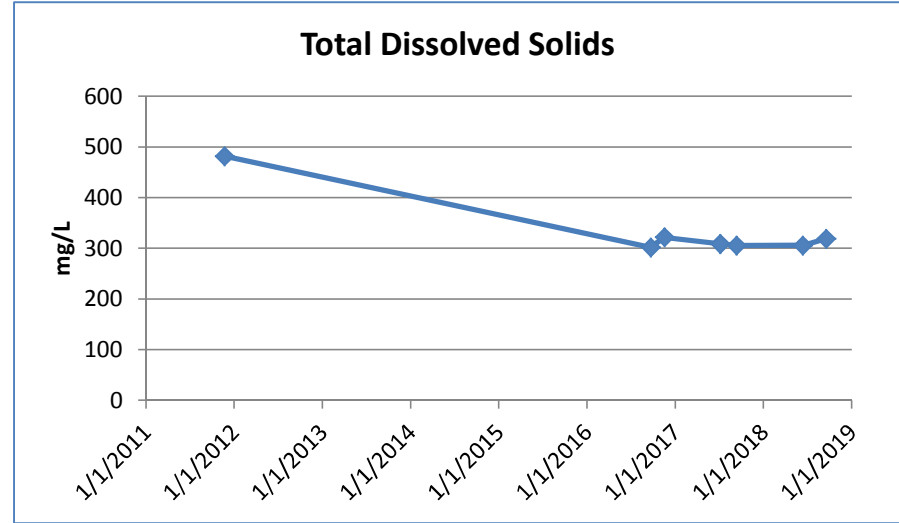
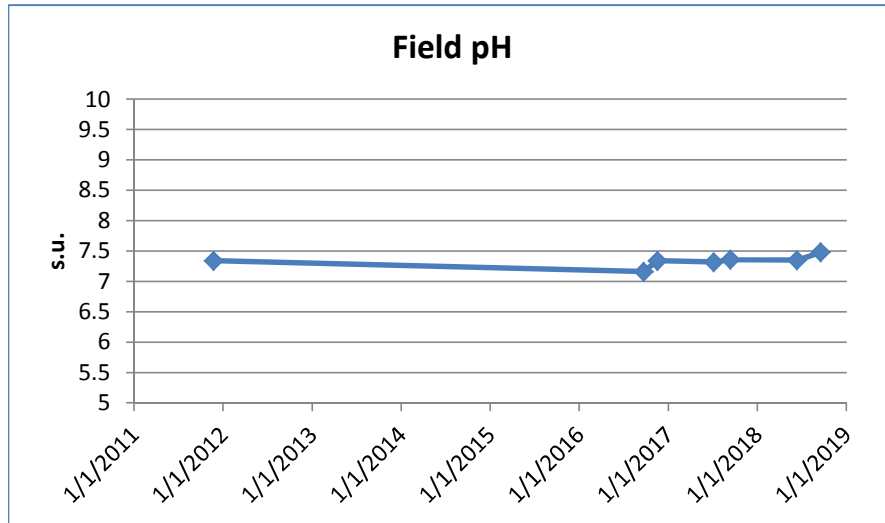
SC15-198



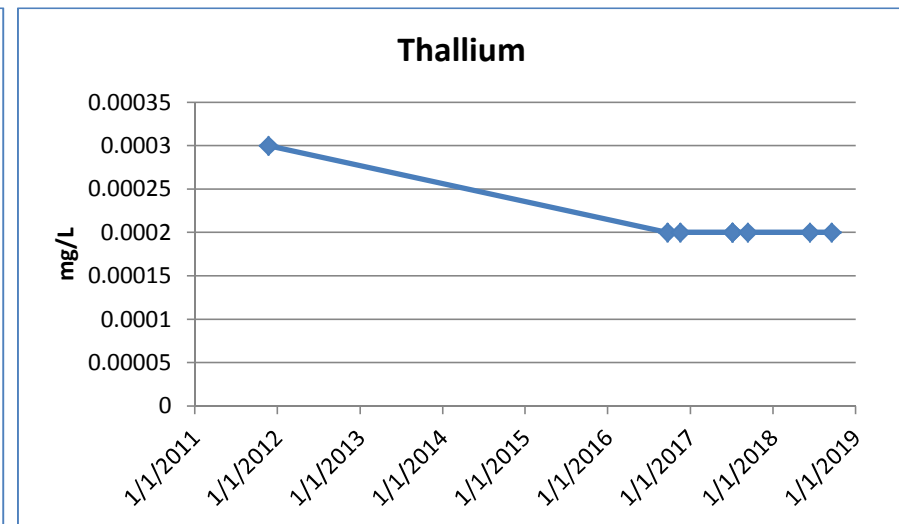
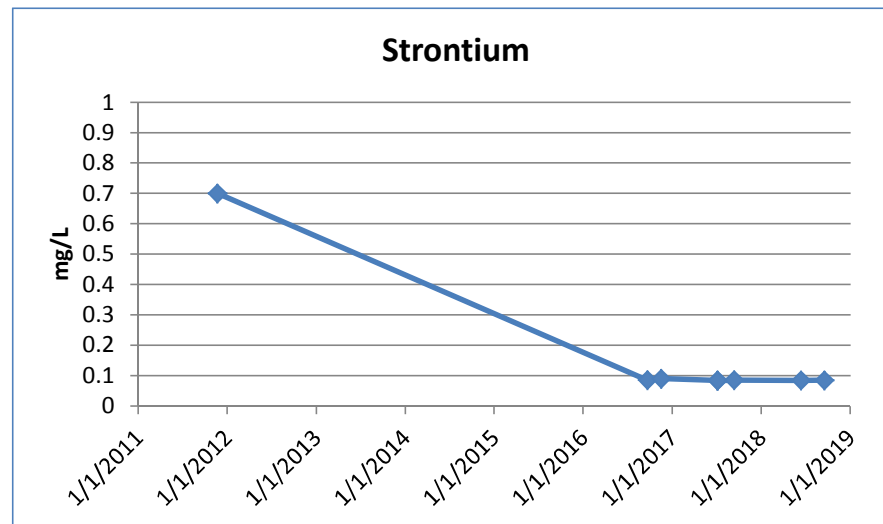
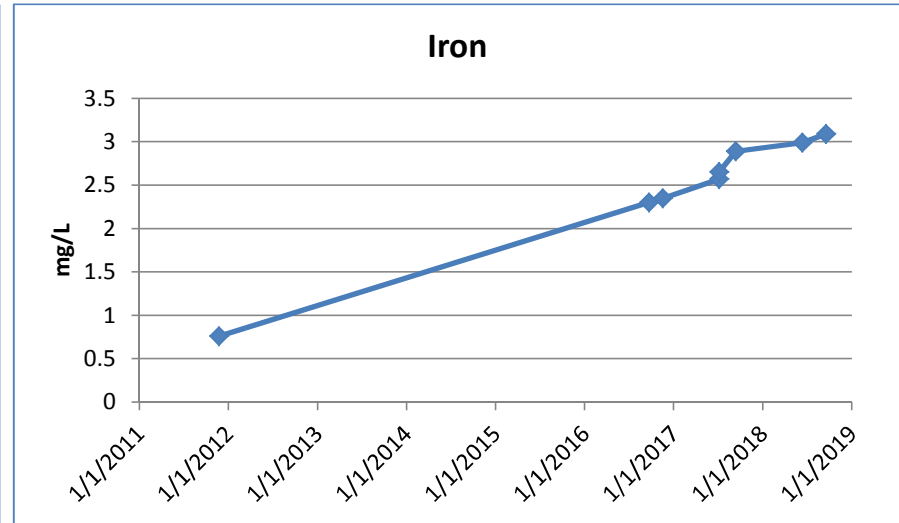
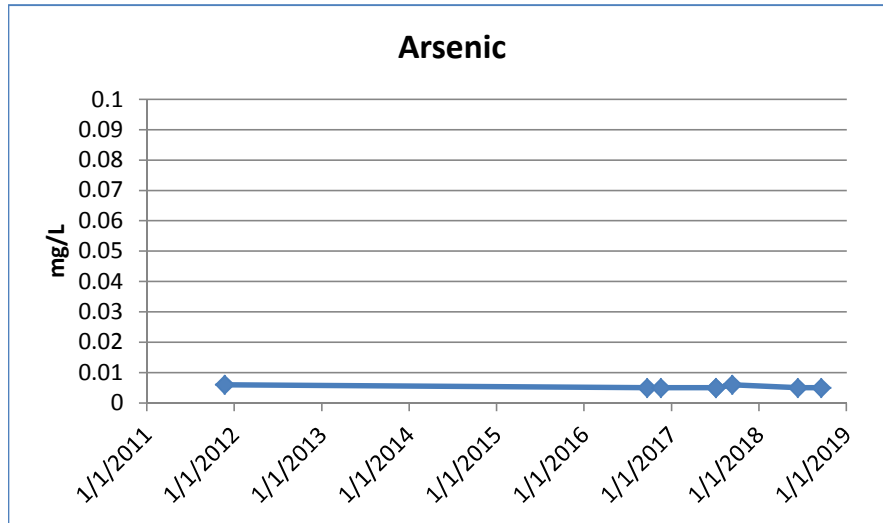
SC15-198



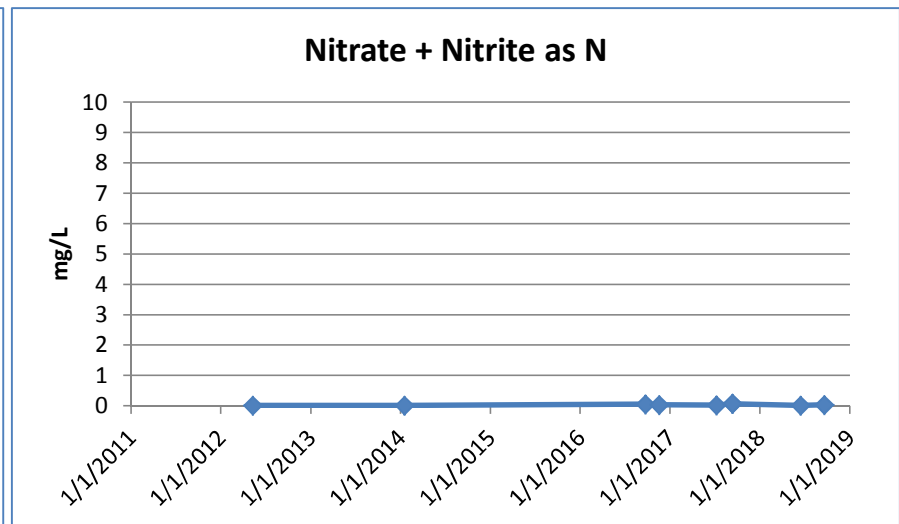
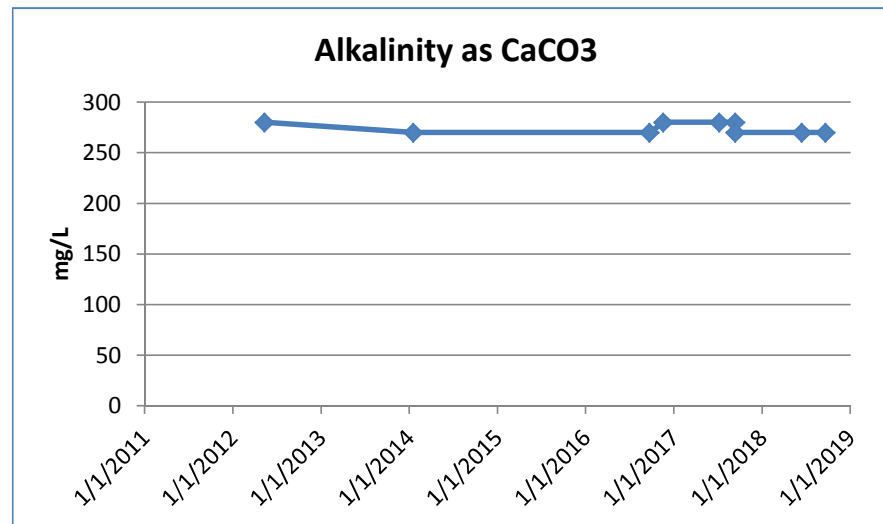
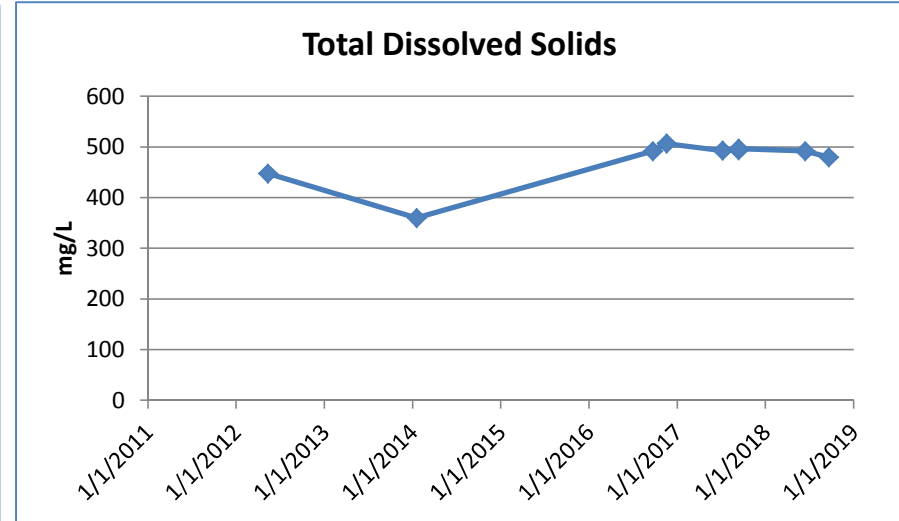
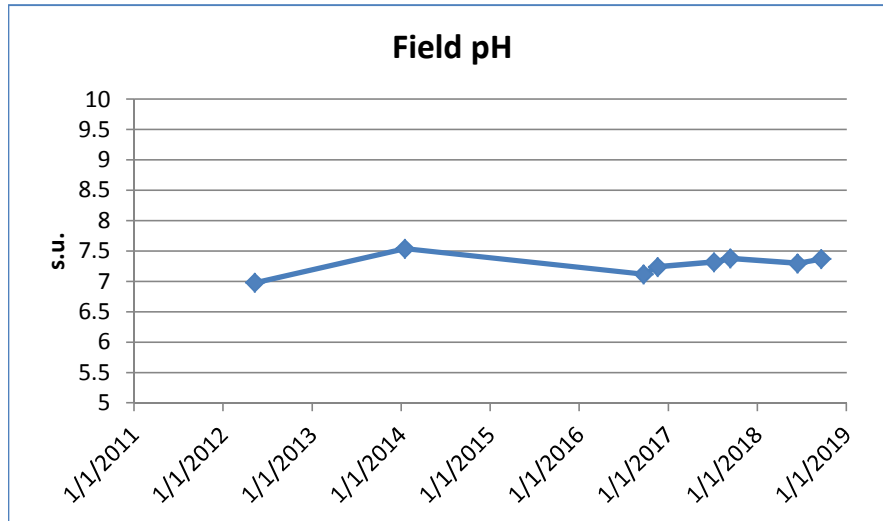
PW-2



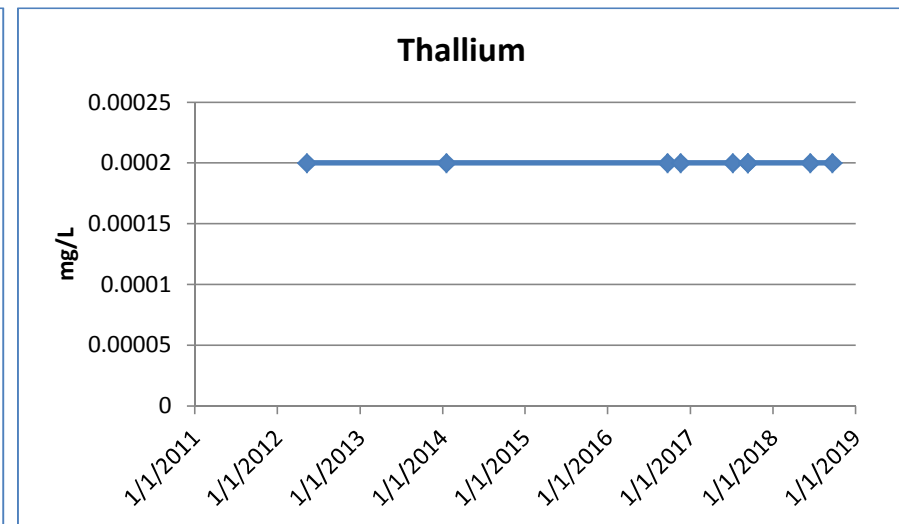
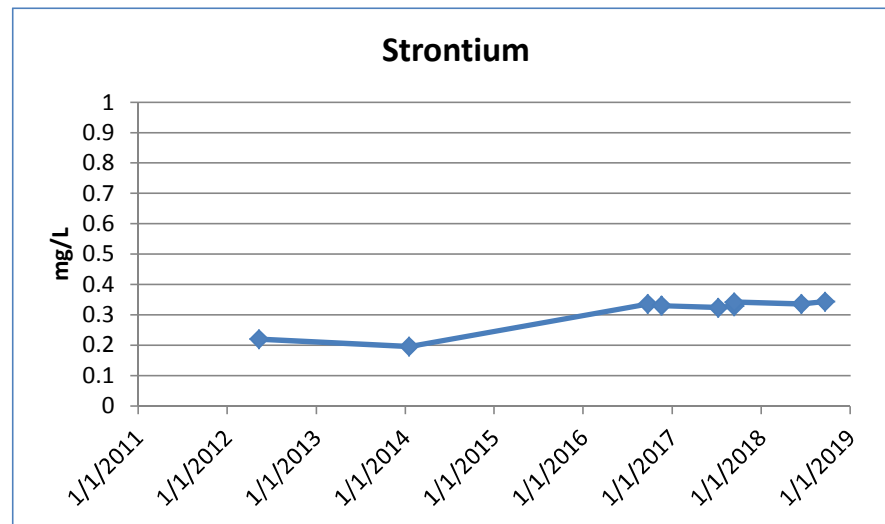
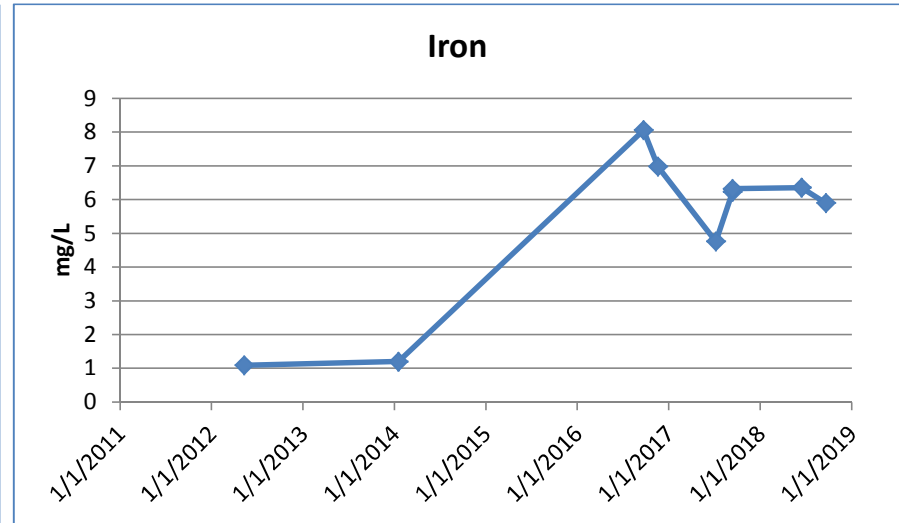
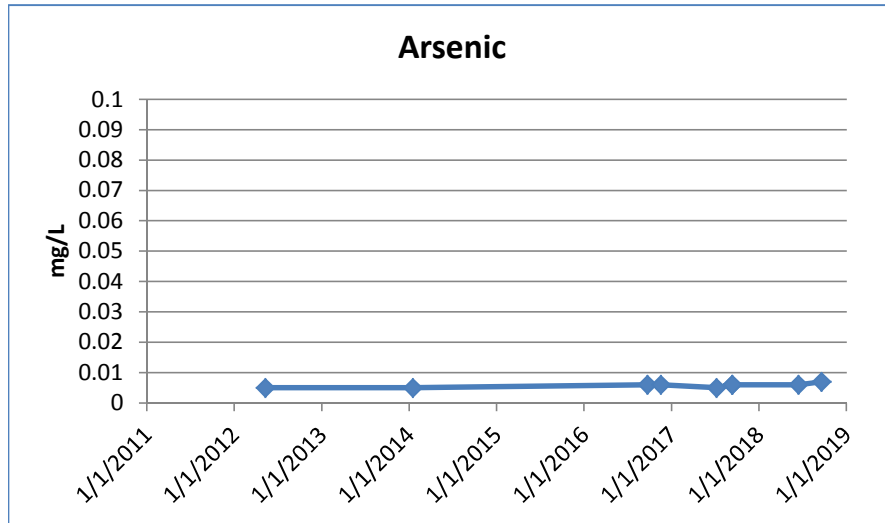
PW-2



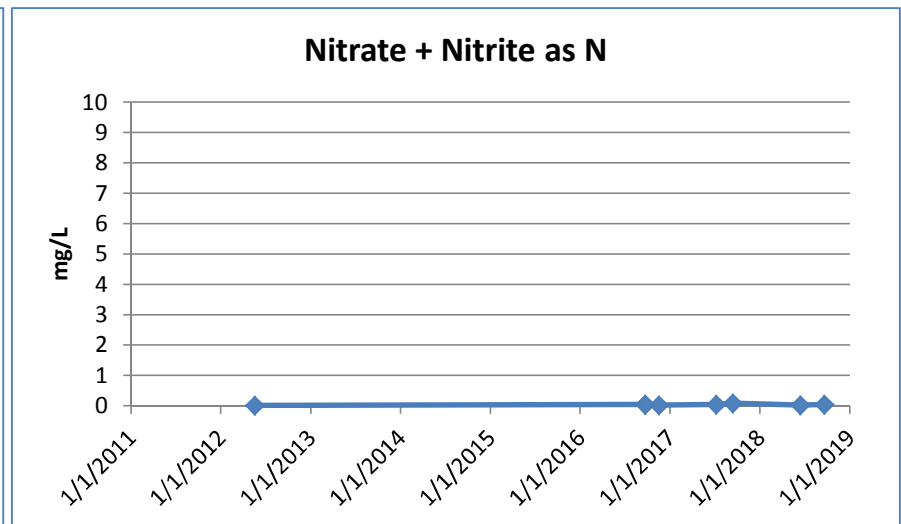
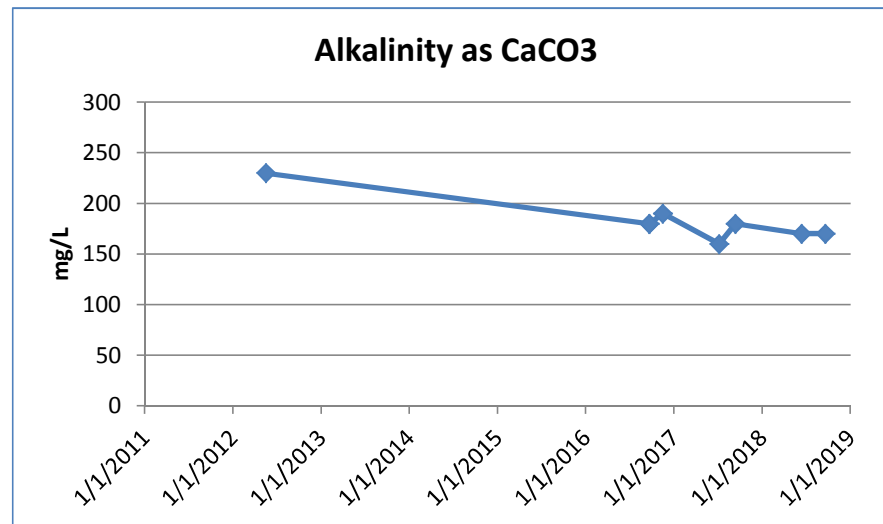
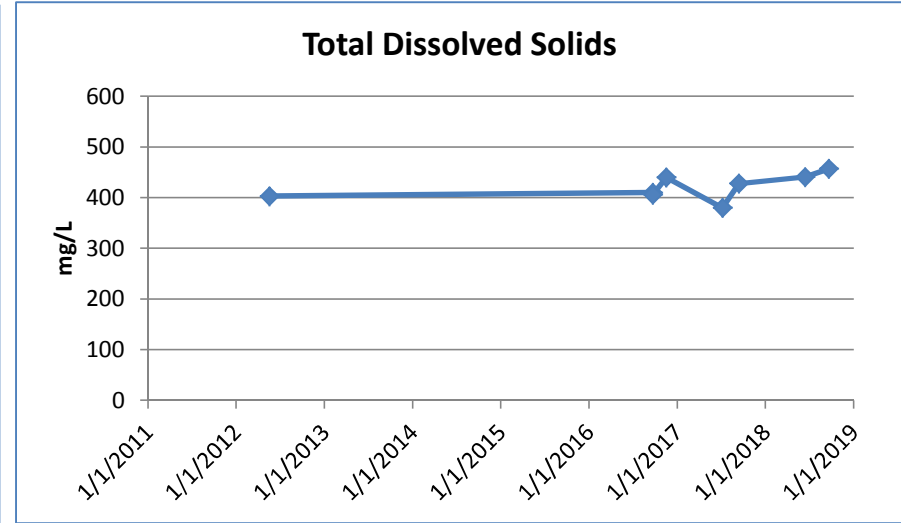
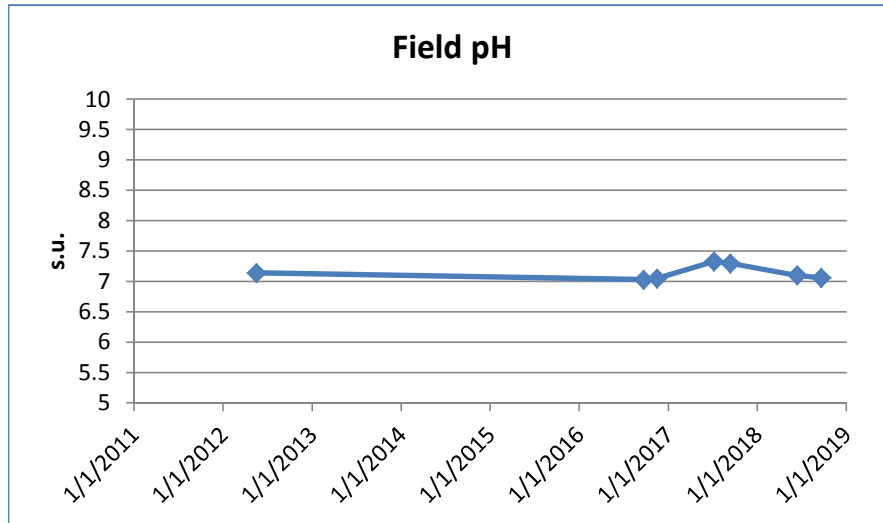
PW-3



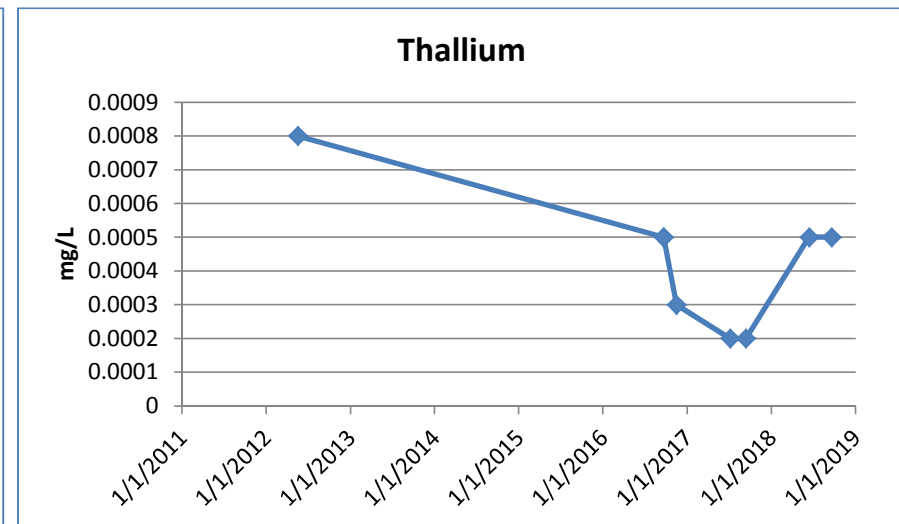
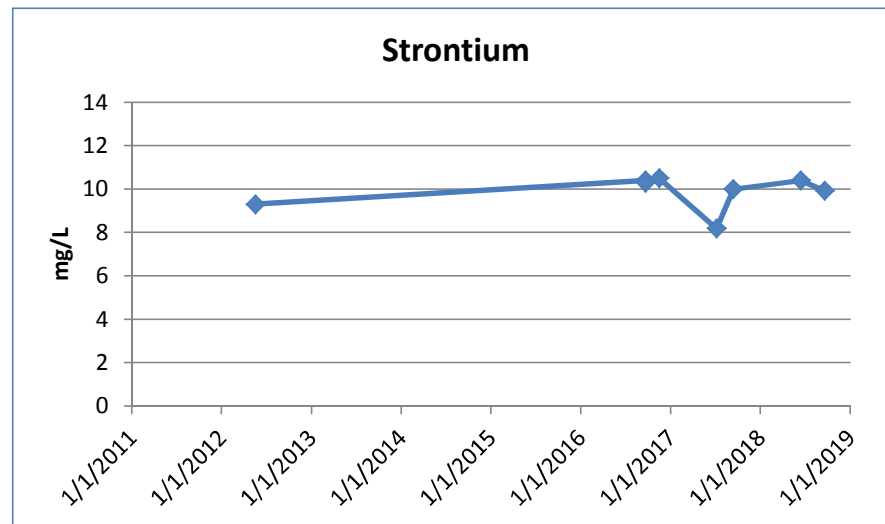
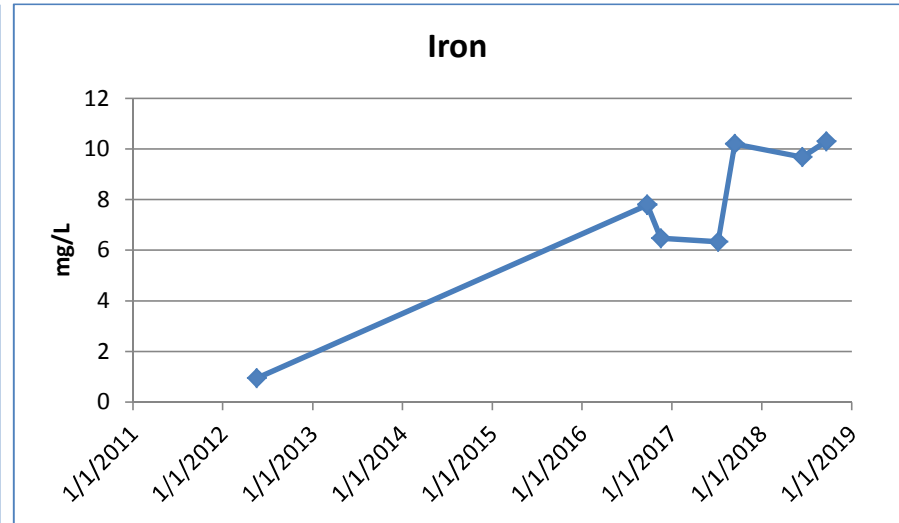
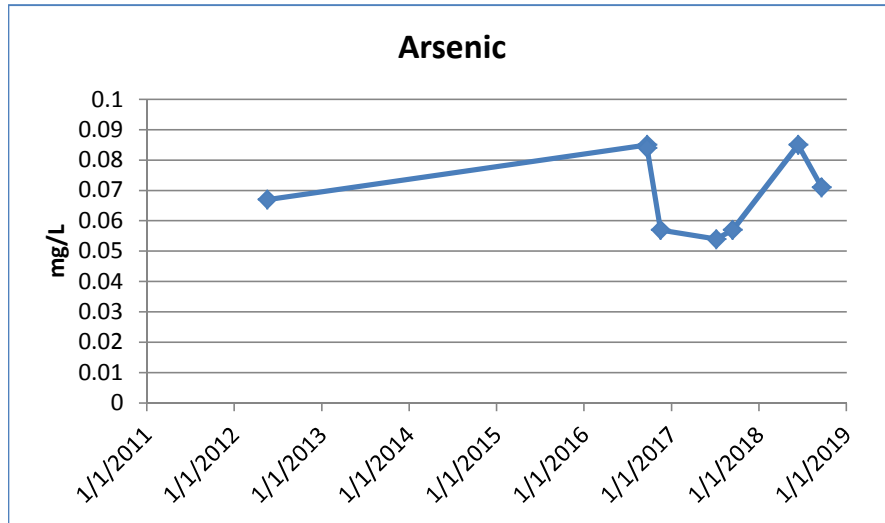
PW-3



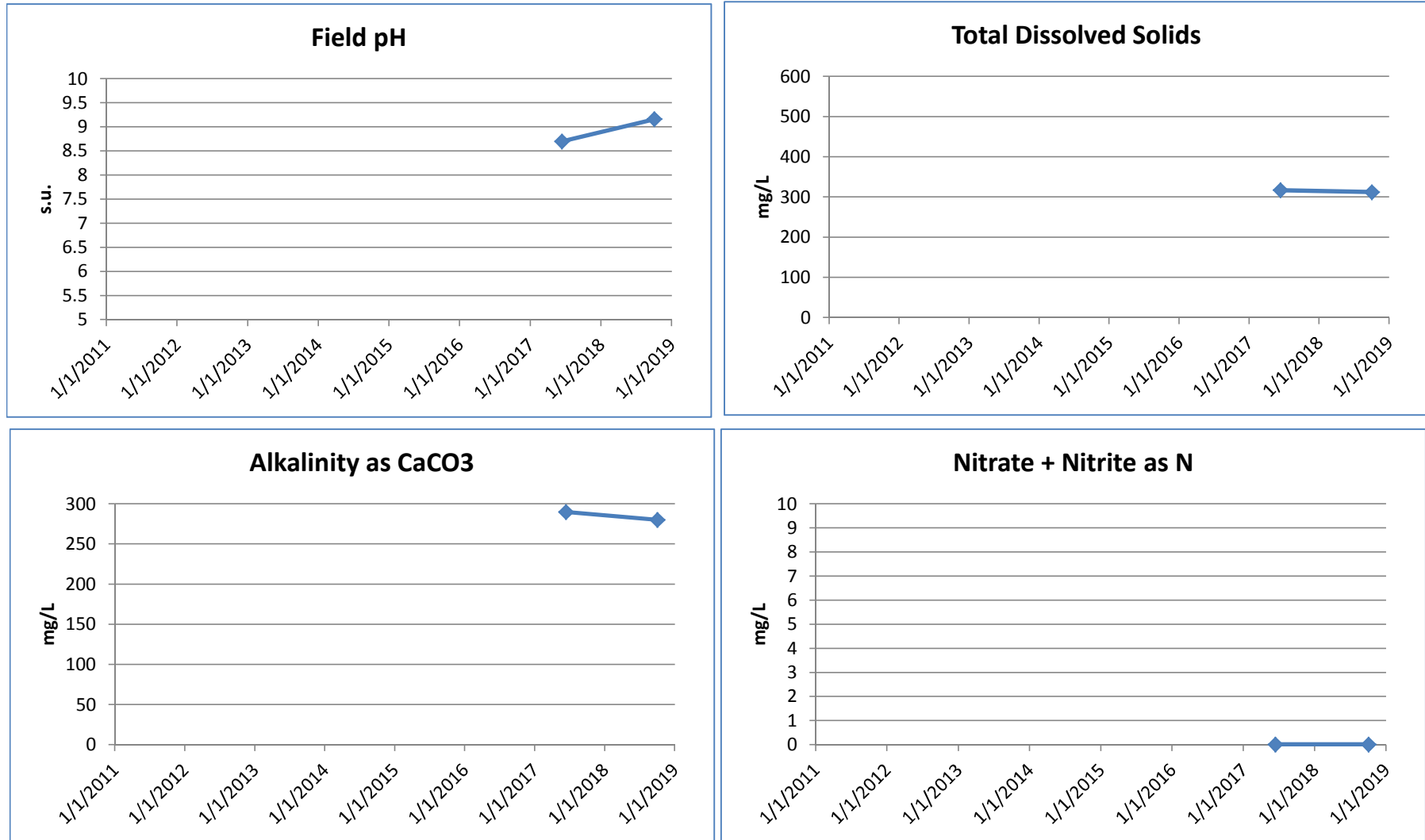
PW-4



PW-4



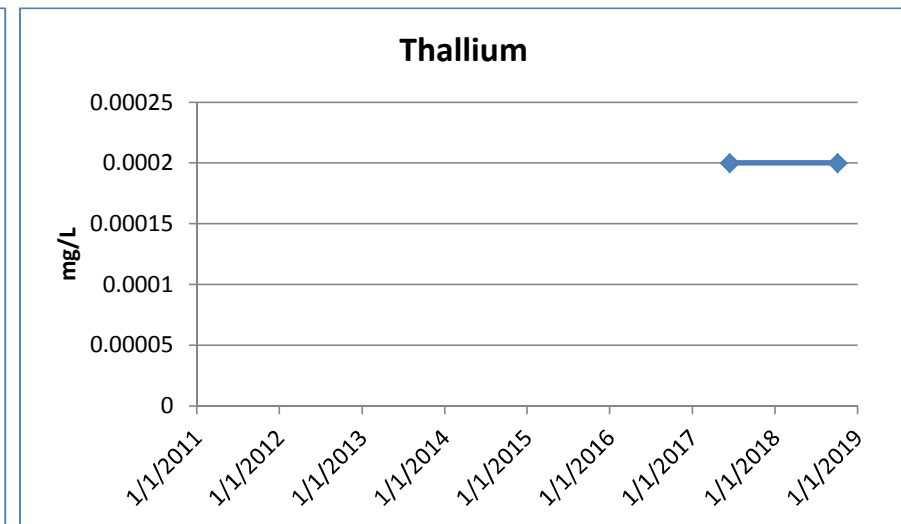
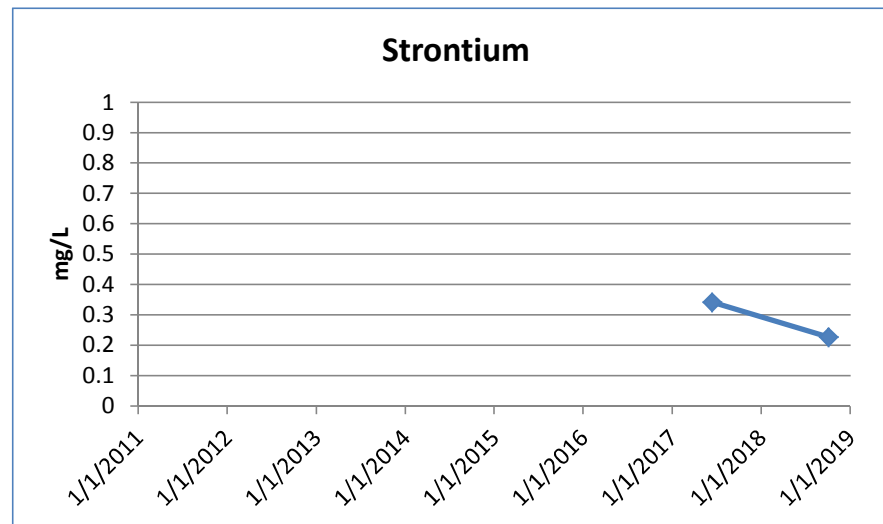
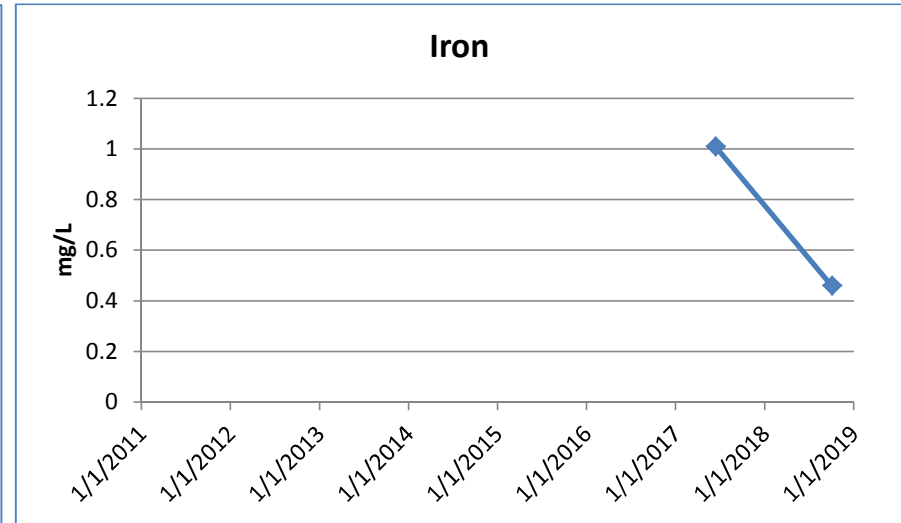
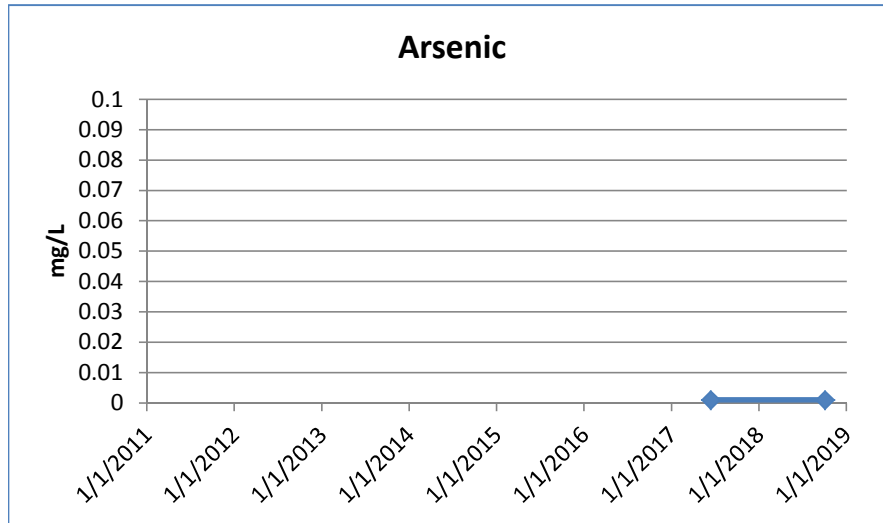
PW-7



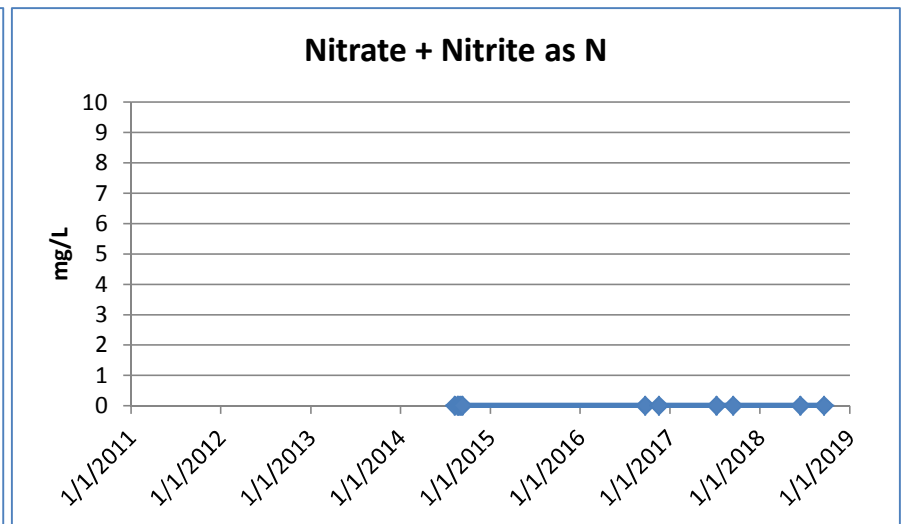
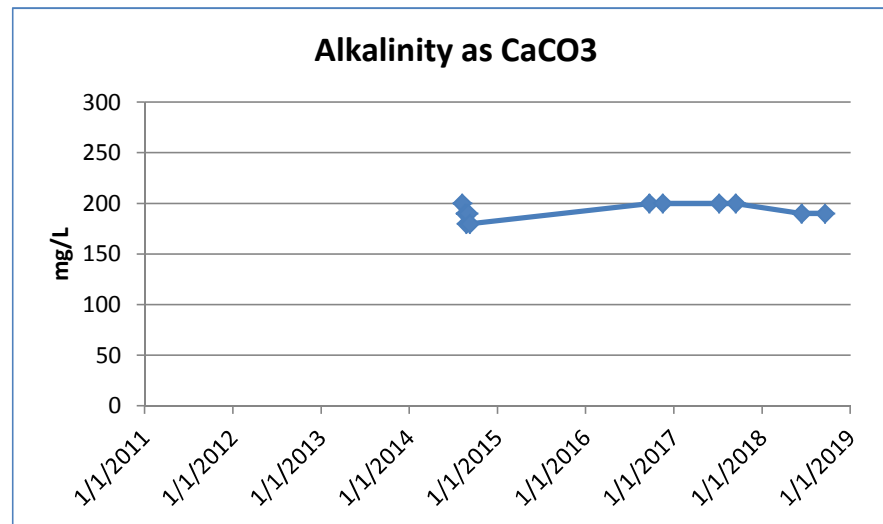
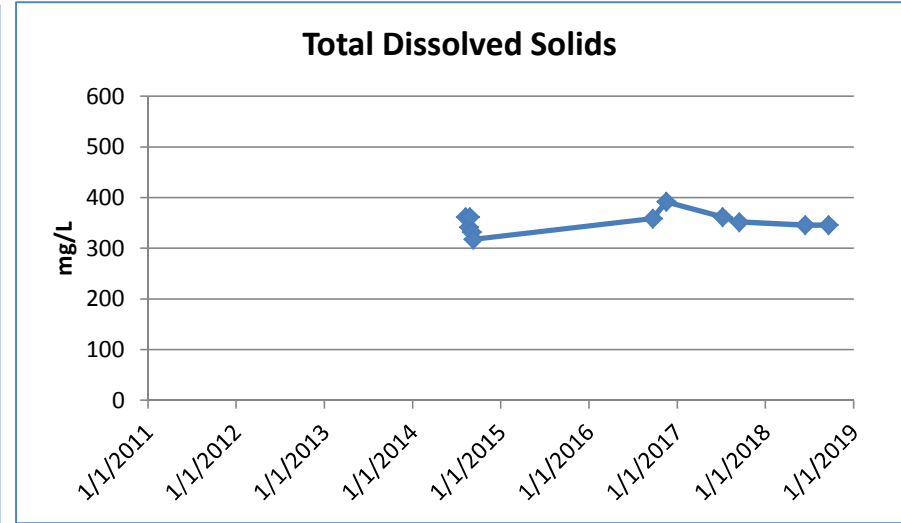
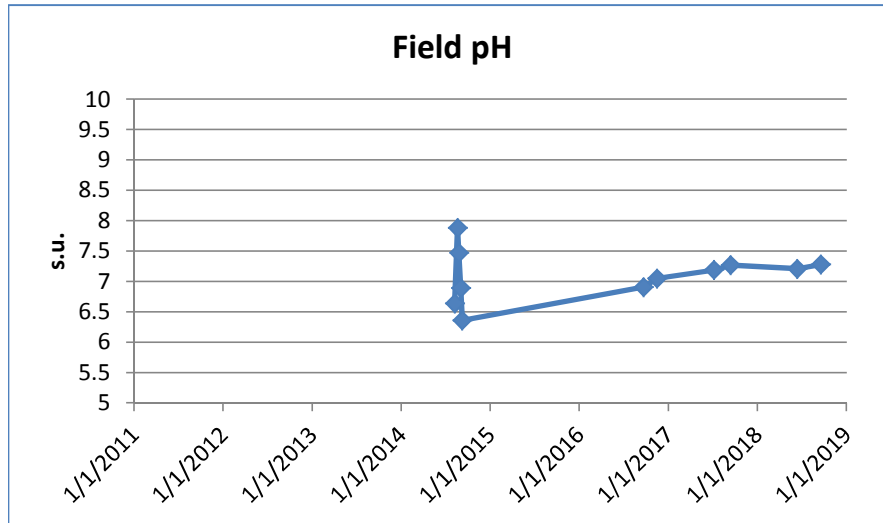
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**PW-7 Data Trend Graph
Black Butte Copper Project
Meagher County, Montana**

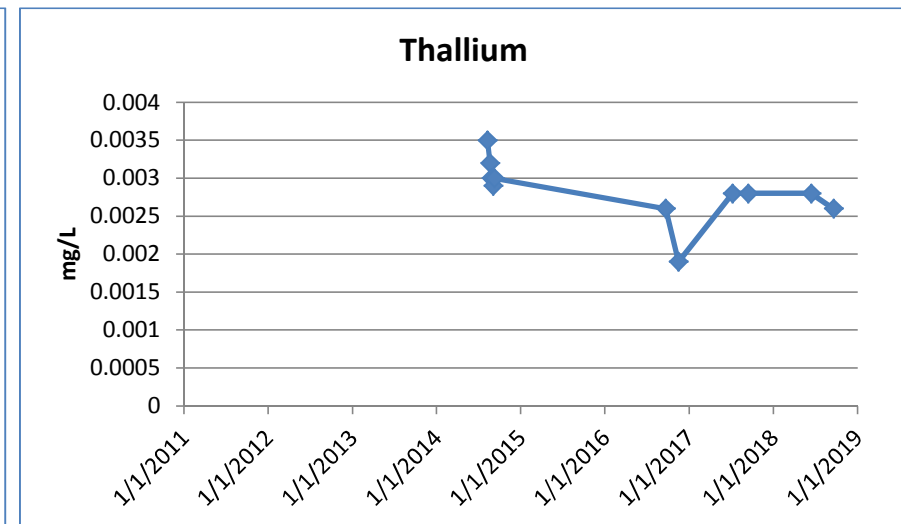
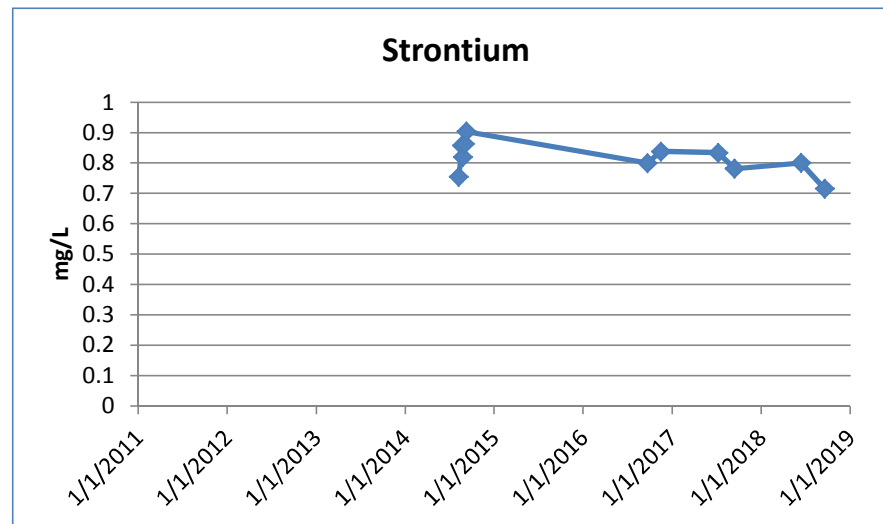
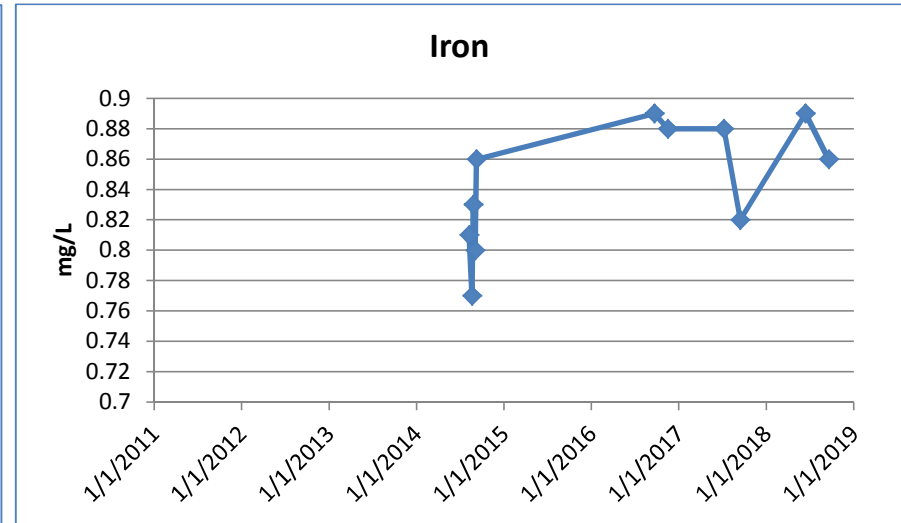
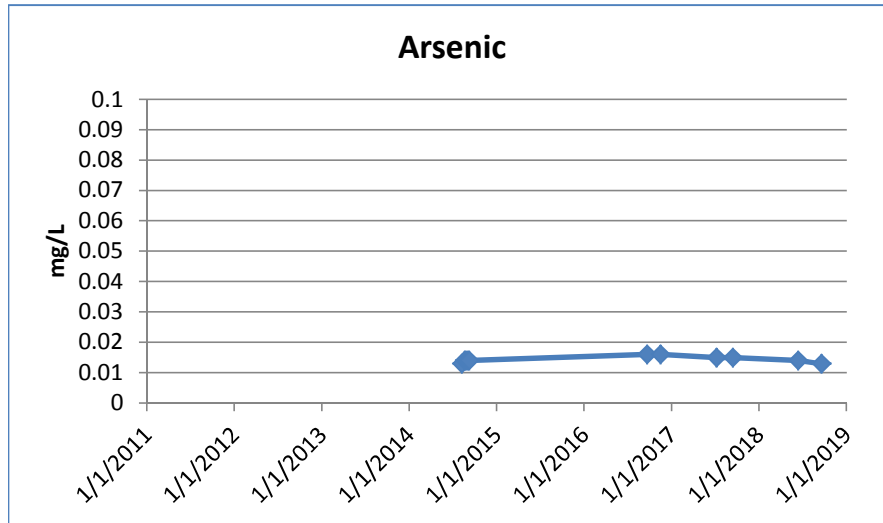
PW-7



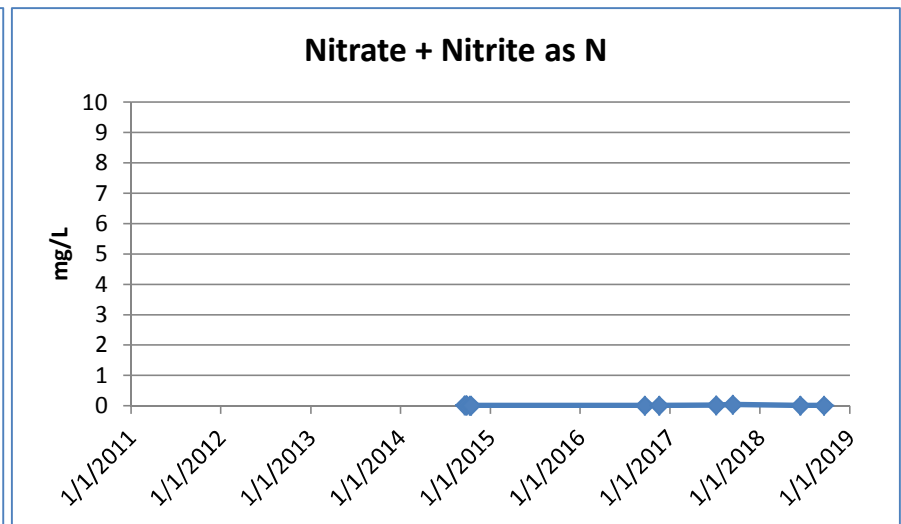
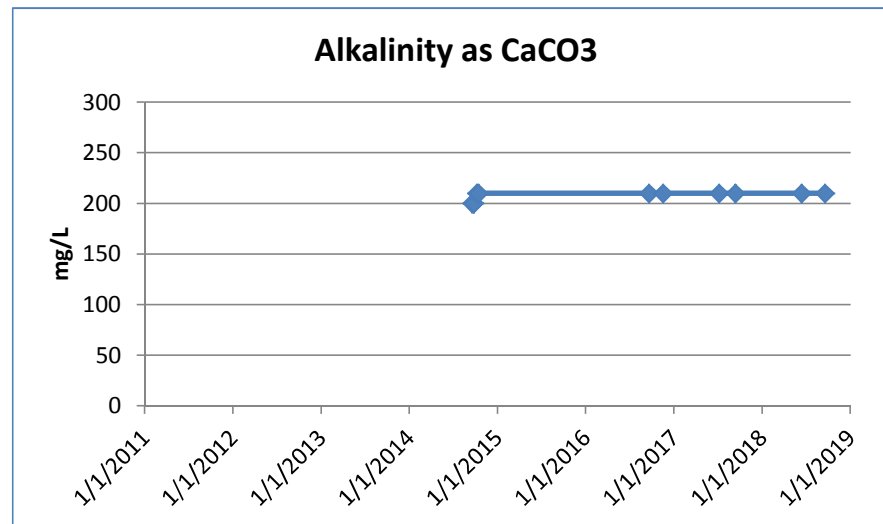
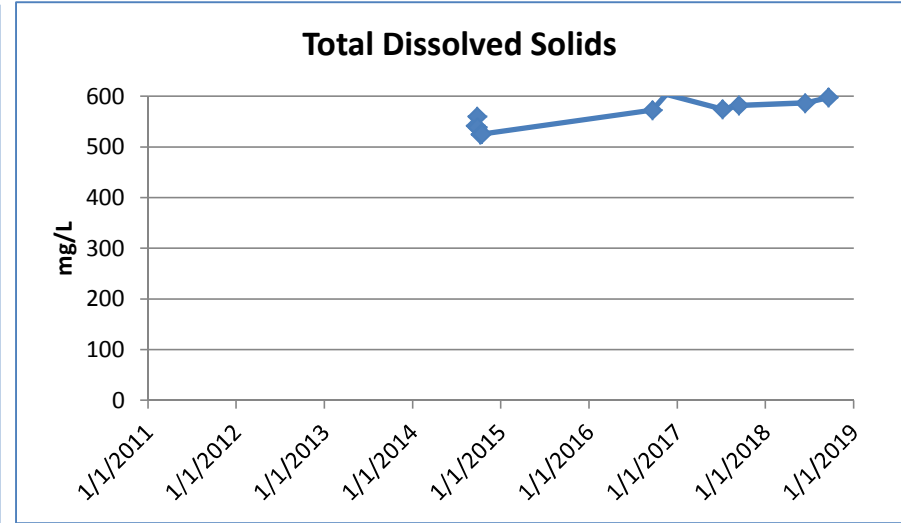
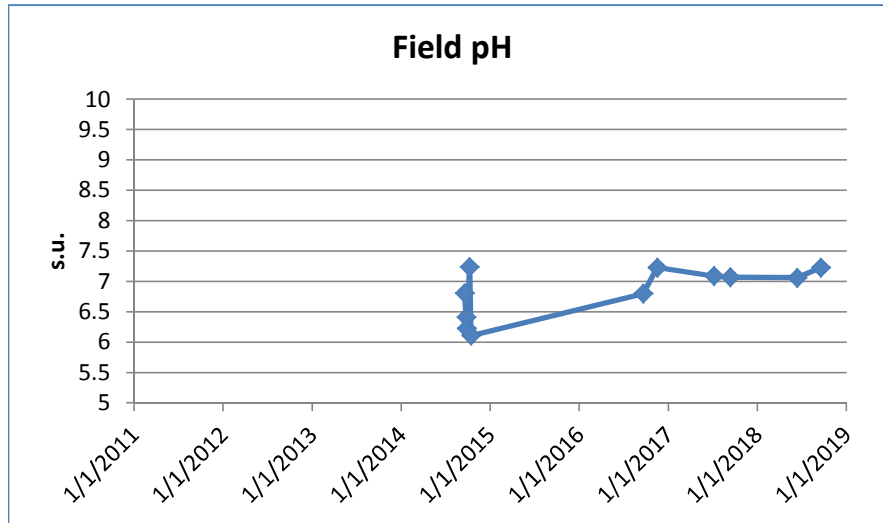
PW-8



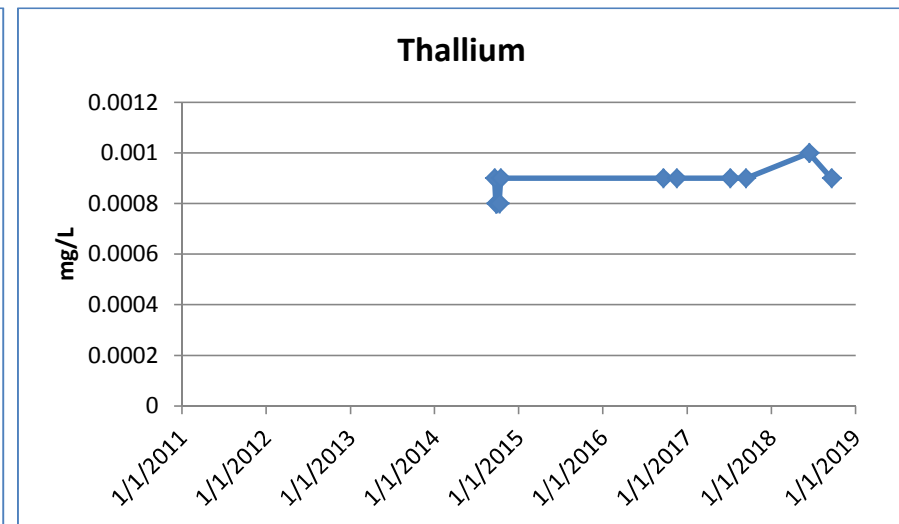
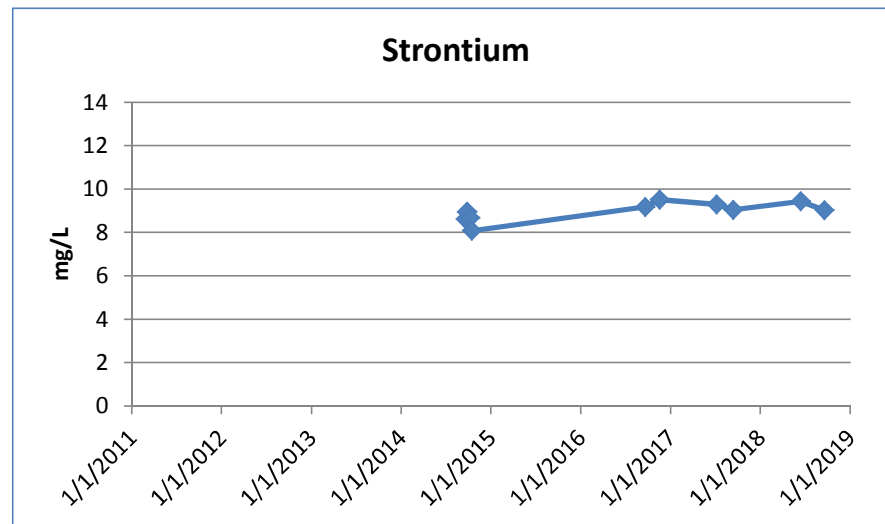
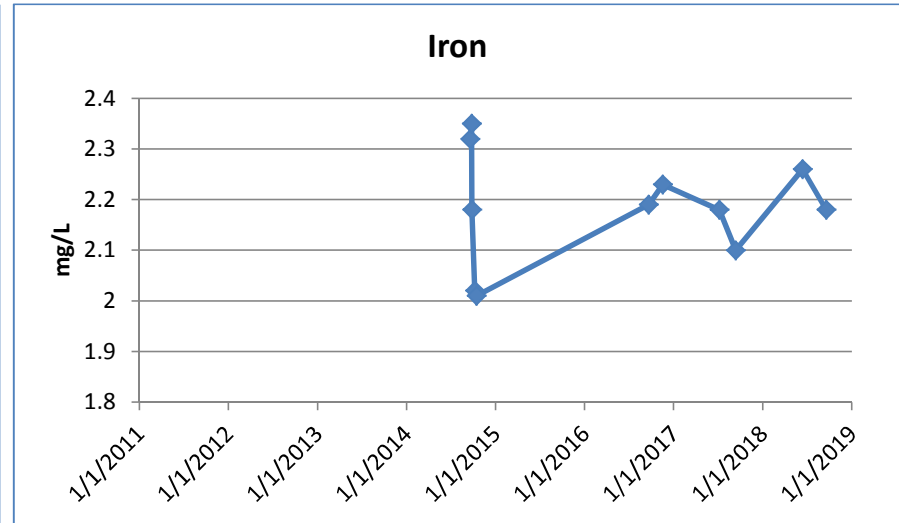
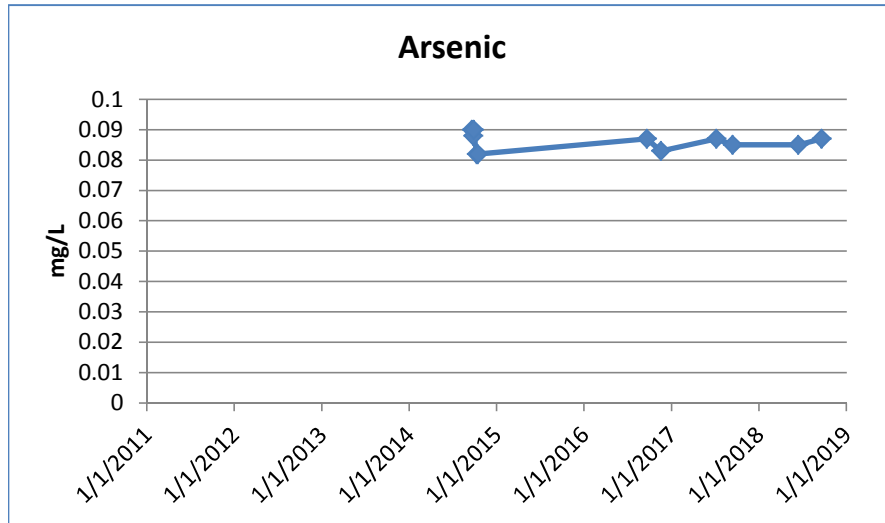
PW-8



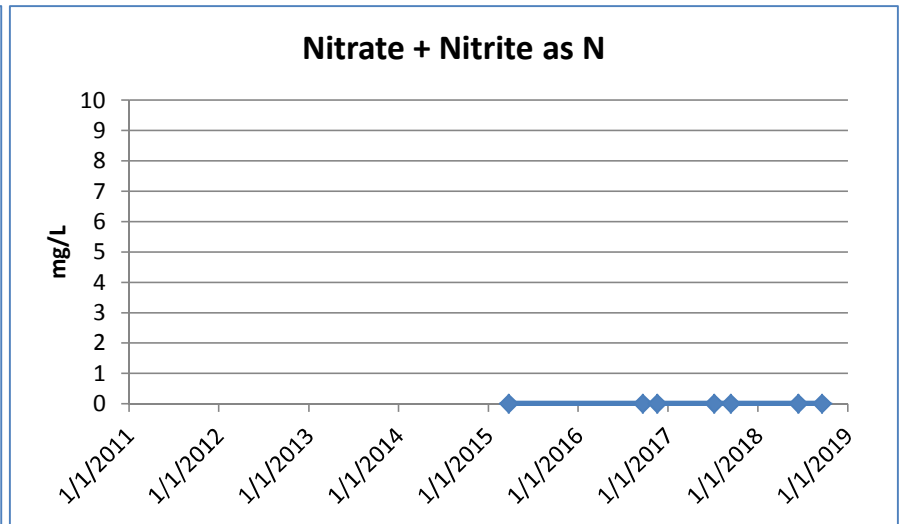
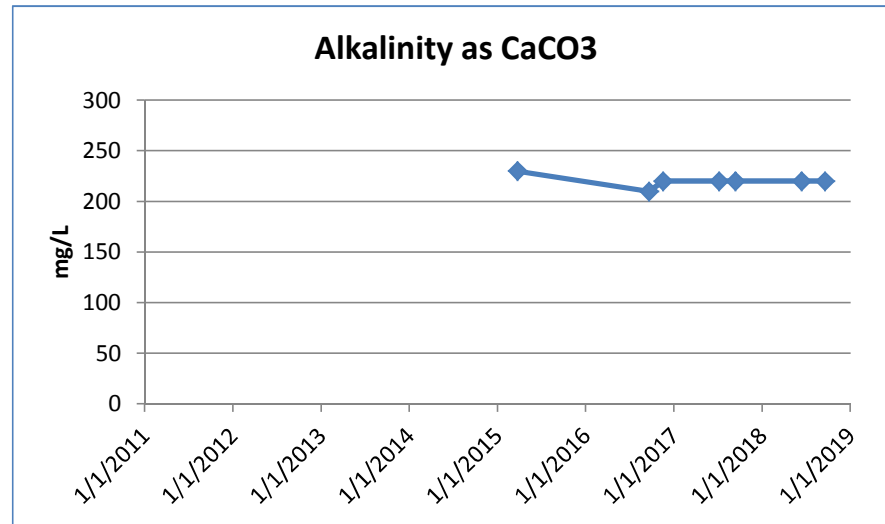
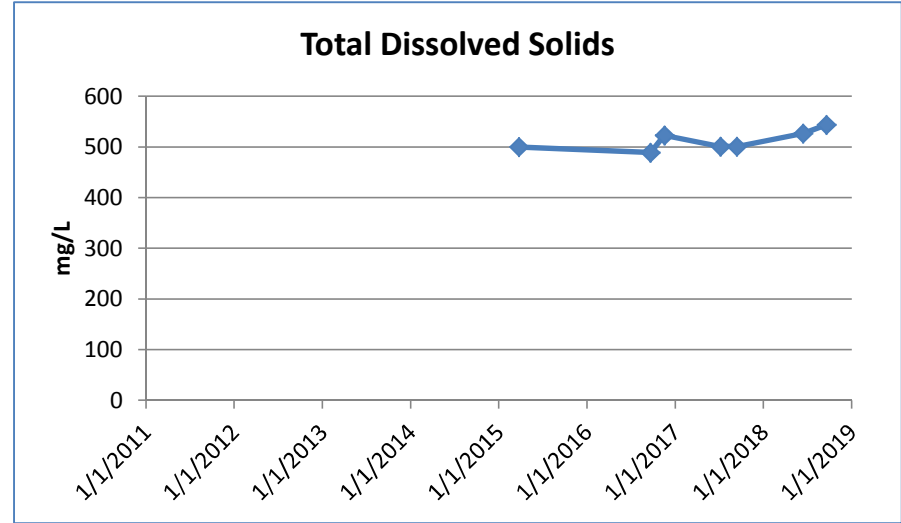
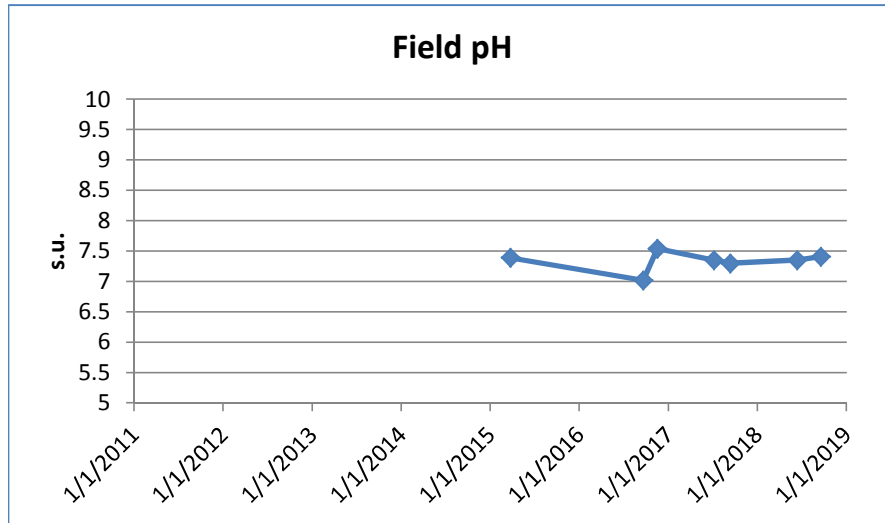
PW-9



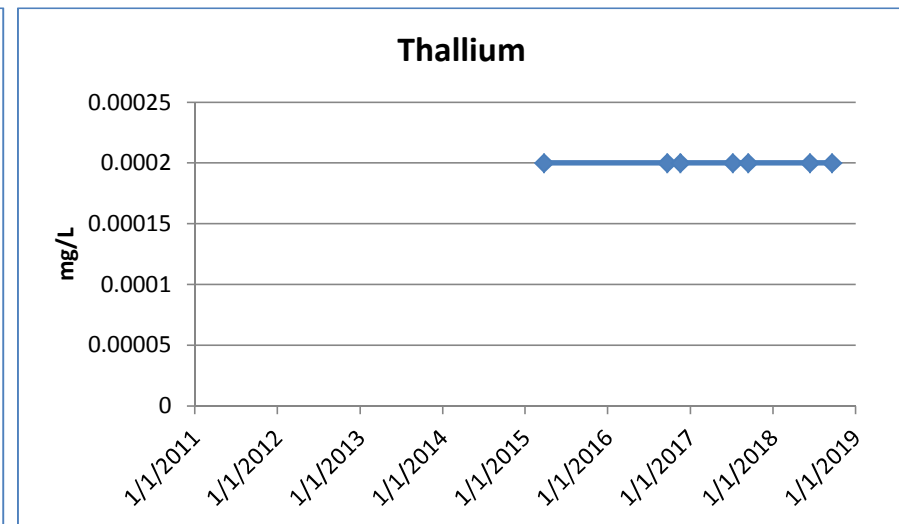
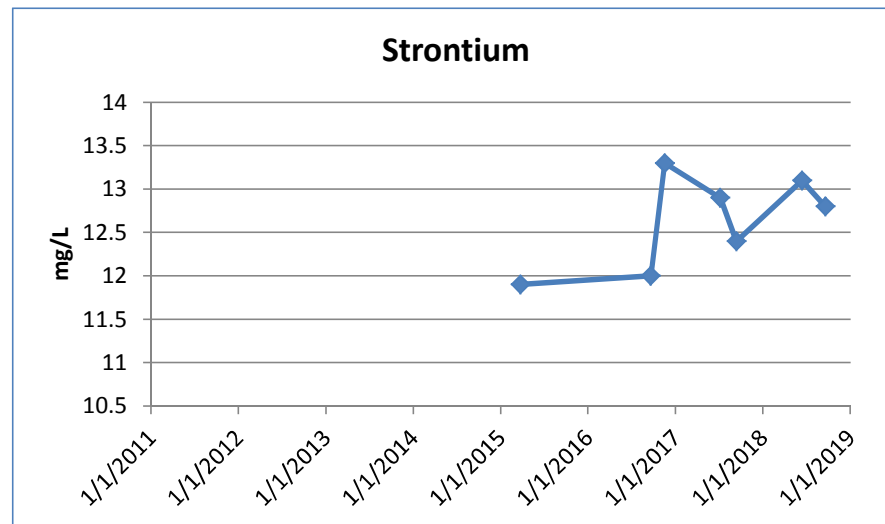
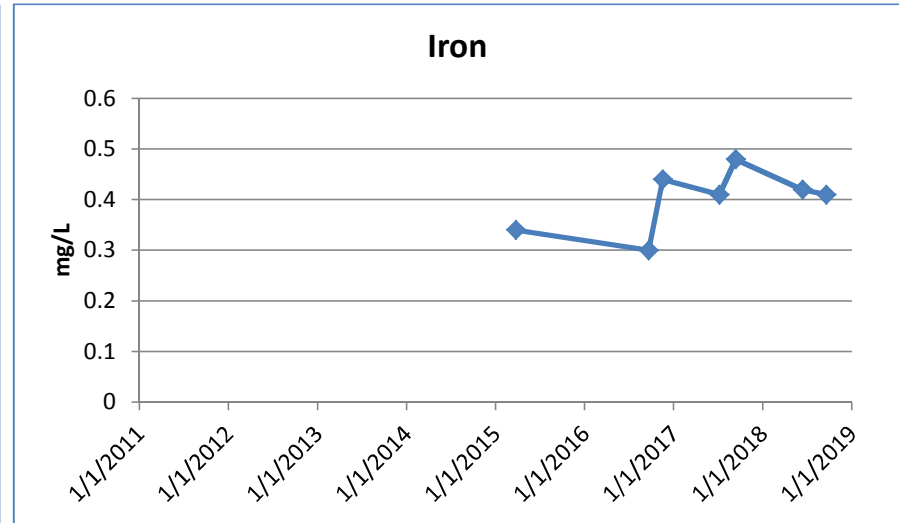
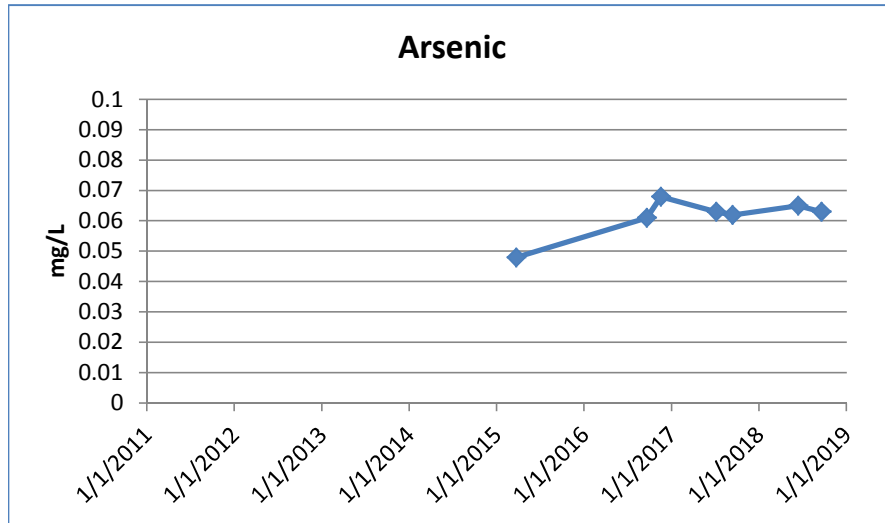
PW-9



PW-10



PW-10



APPENDIX E

QUALITY ASSURANCE / QUALITY CONTROL SUMMARY

Station Name	Reporting Units	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank
Sample Date		1/17/18 17:00	1/17/18 17:30	1/24/18 16:30	2/16/18 08:30	2/20/18 08:00	3/20/18 16:50	3/20/18 17:30	3/21/18 09:30	4/12/18 15:30	4/12/18 16:00	5/23/18 16:30	5/24/18 13:30	6/12/18 13:00	6/13/18 10:10	6/13/18 11:30	7/24/18 14:45	7/25/18 12:10	8/28/18 13:50	8/29/18 08:35	9/18/18 13:45	9/19/18 08:15	9/19/18 16:30	10/23/18 14:20
Sample ID		BBC-1801-113	BBC-1801-114	BBC-1801-206	BBC-1802-101	BBC-1802-100	BBC-1803-127	BBC-1803-128	BBC-1803-214	BBC-1804-113	BBC-1804-114	BBC-1805-113	BBC-1805-122	BBC-1806-115	BBC-1806-213	BBC-1806-129	BBC-1807-108	BBC-1807-122	BBC-1808-107	BBC-1808-116	BBC-1809-115	BBC-1809-206	BBC-1809-146	BBC-1810-106
Lab Name		Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks		Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank
Lab Sample ID		H18010281-004	H18010282-007	H18010387-006	H18020279-001	H18020280-001	H18030349-004	H18030350-010	H18030348-015	H18040276-007	H18040275-003	H18050624-011	H18050618-008	H18060369-010	H18060368-014	H18060370-013	H18070561-008	H18070565-013	H18080619-008	H18080620-007	H18090466-010	H18090467-007	H18090469-012	H18100607-007
Physical Parameters																								
Total Dissolved Solids	mg/L	<10	<10	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Total Suspended Solids	mg/L	<10	<4	<10	<10	<4	<10	<4	<10	<4	<10	<10	<4	<4	<10	<10	<4	<10	<4	<10	<4	<10	<10	<4
Major Constituents - Common Ions																								
Alkalinity as CaCO3	mg/L	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Calcium (DIS)	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluoride	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hardness as CaCO3	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium (DIS)	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Potassium (DIS)	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sodium (DIS)	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sulfate	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nutrients																								
Nitrate + Nitrite as N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorus (TOT)	mg/L	--	<0.003	--	--	<0.003	--	<0.003	--	<0.003	--	--	<0.003	<0.003	--	--	<0.003	--	<0.003	--	<0.003	--	--	<0.003
Total Persulfate Nitrogen	mg/L	--	--	--	--	--	--	--	--	<0.04	--	--	<0.04	<0.04	--	--	<0.04	--	<0.04	--	<0.04	--	--	<0.04
Metals - Trace Constituents																								
Aluminum (DIS)	mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Antimony (DIS)	mg/L	<0.0005	--	<0.0005	<0.0005	--	<0.0005	--	<0.0005	--	<0.0005	<0.0005	--	--	<0.0005	<0.0005	--	<0.0005	--	<0.0005	--	<0.0005	<0.0005	--
Antimony (TRC)	mg/L	--	<0.0005	--	--	<0.0005	--	<0.0005	--	<0.0005	--	--	<0.0005	<0.0005	--	--	<0.0005	--	<0.0005	--	<0.0005	--	--	<0.0005
Arsenic (DIS)	mg/L	<0.001	--	<0.001	<0.001	--	<0.001	--	<0.001	--	<0.001	<0.001	--	--	<0.001	<0.001	--	<0.001	--	<0.001	--	<0.001	<0.001	--
Arsenic (TRC)	mg/L	--	<0.001	--	--	<0.001	--	<0.001	--	<0.001	--	--	<0.001	<0.001	--	--	<0.001	--	<0.001	--	<0.001	--	--	<0.001
Barium (DIS)	mg/L	<0.003	--	<0.003	<0.003	--	<0.003	--	<0.003	--	<0.003	<0.003	--	--	<0.003	<0.003	--	<0.003	--	<0.003	--	<0.003	<0.003	--
Barium (TRC)	mg/L	--	<0.003	--	--	<0.003	--	<0.003	--	<0.003	--	--	<0.003	<0.003	--	--	<0.003	--	<0.003	--	<0.003	--	--	<0.003
Beryllium (DIS)	mg/L	<0.0008	--	<0.0008	<0.0008	--	<0.0008	--	<0.0008	--	<0.0008	<0.0008	--	--	<0.0008	<0.0008	--	<0.0008	--	<0.0008	--	<0.0008	<0.0008	--
Beryllium (TRC)	mg/L	--	<0.0008	--	--	<0.0008	--	<0.0008	--	<0.0008	--	--	<0.0008	<0.0008	--	--	<0.0008	--	<0.0008	--	<0.0008	--	--	<0.0008
Cadmium (DIS)	mg/L	<0.00003	--	<0.00003	<0.00003	--	<0.00003	--	<0.00003	--	<0.00003	<0.00003	--	--	<0.00003	<0.00003	--	<0.00003	--	<0.00003	--	<0.00003	<0.00003	--
Cadmium (TRC)	mg/L	--	<0.00003	--	--	<0.00003	--	<0.00003	--	<0.00003	--	--	<0.00003	<0.00003	--	--	<0.00003	--	<0.00003	--	<0.00003	--	--	<0.00003
Chromium (DIS)	mg/L	<0.01	--	<0.01	<0.01	--	<0.01	--	<0.01	--	<0.01	<0.01	--	--	<0.01	<0.01	--	<0.01	--	<0.01	--	<0.01	<0.01	--
Chromium (TRC)	mg/L	--	<0.01	--	--	<0.01	--	<0.01	--	<0.01	--	--	<0.01	<0.01	--	--	<0.01	--	<0.01	--	<0.01	--	--	<0.01
Cobalt (DIS)	mg/L	<0.01	--	<0.01	<0.01	--	<0.01	--	<0.01	--	<0.01	<0.01	--	--	<0.01	<0.01	--	<0.01	--	<0.01	--	<0.01	<0.01	--
Cobalt (TRC)	mg/L	--	<0.01	--	--	<0.01	--	<0.01	--	<0.01	--	--	<0.01	<0.01	--	--	<0.01	--	<0.01	--	<0.01	--	--	<0.01
Copper (DIS)	mg/L	<0.002	--	<0.002	<0.002	--	<0.002	--	<0.002	--	<0.002	<0.002	--	--	<0.002	<0.002	--	<0.002	--	<0.002	--	<0.002	<0.002	--
Copper (TRC)	mg/L	--	<0.002	--	--	<0.002	--	<0.002	--	<0.002	--	--	<0.002	<0.002	--	--	<0.002	--	<0.002	--	<0.002	--		

Station Name	Reporting Units	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	DI-Blank	RINSATE BLANK	RINSATE BLANK	RINSATE BLANK	RINSATE BLANK	RINSATE BLANK
Sample Date		10/24/18 14:00	11/12/18 16:15	11/14/18 13:30	11/15/18 17:00	12/14/18 10:25	12/14/18 15:00	1/24/18 17:00	3/21/18 16:30	6/14/18 19:10	9/21/18 13:15	11/15/18 10:40
Sample ID		BBC-1810-122	BBC-1811-114	BBC-1811-215	BBC-1811-125	BBC-1812-107	BBC-1812-121	BBC-1801-207	BBC-1803-223	BBC-1806-233	BBC-1809-233	BBC-1811-224
Lab Name		Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs	Energy Labs
Remarks		Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank	Blank
Lab Sample ID		H18100608-011	H18110265-009	H18110402-004	H18110402-023	H18120294-007	H18120295-008	H18010387-007	H18030348-023	H18060368-034	H18090538-017	H18110402-013
Physical Parameters												
Total Dissolved Solids	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Total Suspended Solids	mg/L	<10	<4	<10	<10	<4	<10	<10	<10	<10	<10	<10
Major Constituents - Commons Ions												
Alkalinity as CaCO3	mg/L	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Calcium (DIS)	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloride	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluoride	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hardness as CaCO3	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1
Magnesium (DIS)	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Potassium (DIS)	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sodium (DIS)	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sulfate	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nutrients												
Nitrate + Nitrite as N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorus (TOT)	mg/L	--	<0.003	--	--	<0.003	--	--	--	--	--	--
Total Persulfate Nitrogen	mg/L	--	<0.04	--	--	<0.04	--	--	--	--	--	--
Metals - Trace Constituents												
Aluminum (DIS)	mg/L	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Antimony (DIS)	mg/L	<0.0005	--	<0.0005	<0.0005	--	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Antimony (TRC)	mg/L	--	<0.0005	--	--	<0.0005	--	--	--	--	--	--
Arsenic (DIS)	mg/L	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic (TRC)	mg/L	--	<0.001	--	--	<0.001	--	--	--	--	--	--
Barium (DIS)	mg/L	<0.003	--	<0.003	<0.003	--	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium (TRC)	mg/L	--	<0.003	--	--	<0.003	--	--	--	--	--	--
Beryllium (DIS)	mg/L	<0.0008	--	<0.0008	<0.0008	--	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Beryllium (TRC)	mg/L	--	<0.0008	--	--	<0.0008	--	--	--	--	--	--
Cadmium (DIS)	mg/L	<0.00003	--	<0.00003	<0.00003	--	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
Cadmium (TRC)	mg/L	--	<0.00003	--	--	<0.00003	--	--	--	--	--	--
Chromium (DIS)	mg/L	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (TRC)	mg/L	--	<0.01	--	--	<0.01	--	--	--	--	--	--
Cobalt (DIS)	mg/L	<0.01	--	<0.01	<0.01	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cobalt (TRC)	mg/L	--	<0.01	--	--	<0.01	--	--	--	--	--	--
Copper (DIS)	mg/L	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Copper (TRC)	mg/L	--	<0.002	--	--	<0.002	--	--	--	--	--	--
Iron (DIS)	mg/L	<0.02	--	<0.02	<0.02	--	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron (TRC)	mg/L	--	<0.02	--	--	<0.02	--	--	--	--	--	--
Lead (DIS)	mg/L	<0.0003	--	<0.0003	<0.0003	--	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Lead (TRC)	mg/L	--	<0.0003	--	--	<0.0003	--	--	--	--	--	--
Manganese (DIS)	mg/L	<0.005	--	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Manganese (TRC)	mg/L	--	<0.005	--	--	<0.005	--	--	--	--	--	--
Mercury (DIS)	mg/L	<0.000005	--	<0.000005	<0.000005	--	--	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Mercury (DIS)	ug/L	--	--	--	--	--	<0.005	--	--	--	--	--
Mercury (TRC)	mg/L	--	<0.000005	--	--	--	--	--	--	--	--	--
Mercury (TRC)	ug/L	--	--	--	--	<0.005	--	--	--	--	--	--
Molybdenum (DIS)	mg/L	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Molybdenum (TRC)	mg/L	--	<0.002	--	--	<0.002	--	--	--	--	--	--
Nickel (DIS)	mg/L	<0.001	--	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel (TRC)	mg/L	--	<0.001	--	--	<0.001	--	--	--	--	--	--
Selenium (DIS)	mg/L	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Selenium (TRC)	mg/L	--	<0.0002	--	--	<0.0002	--	--	--	--	--	--
Silver (DIS)	mg/L	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silver (TRC)	mg/L	--	<0.0002	--	--	<0.0002	--	--	--	--	--	--
Strontium (DIS)	mg/L	<0.0002	--	<0.0002	<0.0002	--	<0.0002	0.0002	<0.0002	0.0002	<0.0002	<0.0002
Strontium (TRC)	mg/L	--	<0.0002	--	--	<0.0002	--	--	--	--	--	--
Thallium (DIS)	mg/L	<0.0002	--	<0.0002	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium (TRC)	mg/L	--	<0.0002	--	--	<0.002	--	--	--	--	--	--
Uranium (DIS)	mg/L	<0.008	--	<0.0002	<0.0002	--	<0.0002	<0.008	<0.008	<0.008	<0.008	<0.0002
Uranium (TRC)	mg/L	--	<0.008	--	--	<0.0002	--	--	--	--	--	--
Zinc (DIS)	mg/L	<0.002	--	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc (TRC)	mg/L	--	<0.002	--	--	<0.002	--	--	--	--	--	--

z - no laboratory ID
NM = Not measured
NF-ICE = Not flowing; ice on ground
NM-ICE = Not measured; ice prohibitive
NF-DRY = Not flowing; Dry ground

BLACK BUTTE COPPER WRM QA/QC REVIEW
JANUARY 2018
WORK ORDER #: H18010282, H18010281 and H18010387

1. INTRODUCTION

This validation applies to inorganic analyses from 28 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in January 2018. The total number of samples included 11 water samples, 10 site observations, 4 field blanks and 3 field duplicates.

- Validation procedures used are generally consistent with:
 (Check all that apply)
 ☒ EPA CLP National Functional Guidelines for Inorganics Data Review
 ☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
 ☐ Contract Laboratory Program (CLP)
 ☒ Standard
 ☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
 ☒ Yes
 ☐ No
- All documentation of field procedures was provided as required.
 ☒ Yes
 ☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
 Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
 DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
 ☒ Yes
 ☐ No

 Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
 ☐ Yes
 ☒ No – see following table

Date	Parameter	Sample Result (mg/L)	Reporting Limit (mg/L)	Number of Flags
1/24/18	Strontium DIS	0.0002	<0.0002	4
1/24/18	Strontium DIS	0.0002	<0.0002	4

U – Blank samples exceeded QA/QC comparison control limits.

- **Field duplicates**

Field duplicates were collected at the proper frequency.

☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☒ Yes
☐ No

4. **LABORATORY PROCEDURES**

- **Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- **Holding times met**

☒ Yes
☐ No

- **Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes— see following notes
☐ No

NOTES: The Energy Laboratory sample check-in receipt noted the following:
H18010281—Sample check in noted that the time was smudged for sample set BBC-1801-112; the time from the chain of custody was used.

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. **DETECTION LIMITS**

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total dissolved and nickel had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Nickel had the 0.002 mg/l reporting limit was used in place of the requested 0.001 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as n as replacement of the 0.003 mg/l requested.

6. **LABORATORY BLANKS**

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes

☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes

☐ No

7. **LABORATORY MATRIX SPIKES**

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes

☐ No

- Matrix spike recoveries were within the lab specified control limits.

☒ Yes

☐ No

8. **LABORATORY DUPLICATES**

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes

☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% RPD	Lab Flag	Lab Advisory Limits (% RPD)
H18010281-001ADUP	Total Suspended Solids	7.2	R	5

R – Relative percent difference outside of advisory limits

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18010388-002HMSD	Nitrate + Nitrite as N	87	S	90 - 110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.
☒ Yes
☐ No
- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).
☒ Yes
☐ No

**BLACK BUTTE COPPER WRM QA/QC REVIEW
FEBRUARY 2018
WORK ORDER #: H18020280 and H18020279**

1. INTRODUCTION

This validation applies to inorganic analyses from 20 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in February 2018. The total number of samples included 7 water samples, 9 site observations, 2 field blanks and 2 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
☒ EPA CLP National Functional Guidelines for Inorganics Data Review
☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
☐ Contract Laboratory Program (CLP)
☒ Standard
☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
☒ Yes
☐ No
- All documentation of field procedures was provided as required.
☒ Yes
☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
☒ Yes
☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
☒ Yes
☐ No
- **Field duplicates**
Field duplicates were collected at the proper frequency.
☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☐ Yes

☒ No – see following table

Date	Site Code	Parameter	Sample Result (mg/L)	Duplicate Result (mg/L)	Number of Flags
2/16/18	SP-7	Total Suspended Solids	48	25	9

J – Duplicate sample exceeded QA/QC comparison control limits.

4. LABORATORY PROCEDURES

- **Laboratory procedures followed**

☐ CLP-SOW

☐ SW-846

☒ Methods for Chemical Analysis of Water and Wastes

☐ XRF Standard Operating Procedures

- **Holding times met**

☒ Yes

☐ No

- **Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes

☐ No

Sample Conditions met at Check-in

☒ Yes– see following notes

☐ No

NOTES: The Energy Laboratory sample check-in receipt noted the following:

H18020280—Sample check in noted that the bottle for total recoverable metals in sample set BBC-1802-100 has a date of 2/6/17. The laboratory used the date from the other sample bottles of 2/16/18 for date check-in.

Project specified methods were used.

☒ Yes – see following notes

☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes

☐ No

NOTES: It should be noted that total dissolved and nickel had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Nickel had the 0.002 mg/l reporting limit was used in place of the requested 0.001 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as n as replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes

☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes

☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes

☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18020316-003DMS	Total Nitrogen	88	S	90-110

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes

☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☒ Yes

☐ No

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18020316-003DMSD	Total Nitrogen	87	S	90-110
H18020249-002CMSD	Nitrate + Nitrite as N	89	S	90-110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.
☒ Yes
☐ No
- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).
☒ Yes
☐ No

BLACK BUTTE COPPER WRM QA/QC REVIEW
MARCH 2018
WORK ORDER #: H18030350, H18030349, and H18030348

1. INTRODUCTION

This validation applies to inorganic analyses from 81 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in March 2018. The total number of samples included 32 water samples, 41 site observations, 4 field blanks and 4 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
☒ EPA CLP National Functional Guidelines for Inorganics Data Review
☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
☐ Contract Laboratory Program (CLP)
☒ Standard
☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
☒ Yes
☐ No
- All documentation of field procedures was provided as required.
☒ Yes
☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
☒ Yes
☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
☒ Yes
☐ No
- **Field duplicates**
Field duplicates were collected at the proper frequency.
☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☐ Yes

☒ No – see following table

Date	Site Code	Parameter	Sample Result (mg/L)	Duplicate Result (mg/L)	Number of Flags
3/21/18	USGS-SC1	DIS Aluminum	0.061	0.08	24
		DIS Zinc	0.002	0.007	24

J – Duplicate sample exceeded QA/QC comparison control limits.

4. LABORATORY PROCEDURES

- Laboratory procedures followed**

☐ CLP-SOW

☐ SW-846

☒ Methods for Chemical Analysis of Water and Wastes

☐ XRF Standard Operating Procedures

- Holding times met**

☐ Yes

☒ No – see following notes

NOTES: The Energy Laboratory analysis summary report noted that total suspended solids had been analyzed past holding time of 7 days on sample BBC-1803-100 (H18030350-001). The analysis in question was completed one minute after the holding time expired therefore no flag should be applied to this result.

- Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes

☐ No

Sample Conditions met at Check-in

☒ Yes

☐ No

Project specified methods were used.

☒ Yes – see following notes

☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes

☐ No

NOTES: It should be noted that total dissolved solids and nickel had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Nickel had the 0.002 mg/l reporting limit was used in place of the requested 0.001 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as n as replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes

☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes

☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes

☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18030348-013BMS2	IRON	207	S	70 – 130
H18030348-024BMS	SILVER	67	S	70 - 130

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes

☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% RPD	Lab Flag	Lab Advisory Limits (% REC)
H18030348-011ADUP	TSS	10	R	5
H18030348-024BMSD	SILVER	64	R	20

R –Relative percent difference outside of advisory limits

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18030348-013BMSD	IRON	207	S	70 – 130
H18030348-024BMSD	SILVER	131	S	70 - 130

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.
☒ Yes
☐ No
- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).
☒ Yes
☐ No

BLACK BUTTE COPPER WRM QA/QC REVIEW
APRIL 2018
WORK ORDER #: H18040276, H18040275 and H18040355

1. INTRODUCTION

This validation applies to inorganic analyses from 22 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in April 2018. The total number of samples included 9 water samples, 9 site observations, 2 field blanks and 2 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
☒ EPA CLP National Functional Guidelines for Inorganics Data Review
☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
☐ Contract Laboratory Program (CLP)
☒ Standard
☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
☒ Yes
☐ No
- All documentation of field procedures was provided as required.
☒ Yes
☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
☒ Yes
☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
☒ Yes
☐ No
- **Field duplicates**
Field duplicates were collected at the proper frequency.
☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☐ Yes
☒ No – see following table

Date	Site Code	Parameter	Sample Result (mg/L)	Duplicate Result (mg/L)	Number of Flags
4/12/18	SW-1	Total Phosphorus	0.012	0.018	6
4/12/18	SP-4	Total Suspended Solids	57	19	11

J – Duplicate sample exceeded QA/QC comparison control limits.

4. LABORATORY PROCEDURES

- Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- Holding times met**

☒ Yes
☐ No

- Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes
☐ No

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total dissolved solids and nickel had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Nickel had the 0.002 mg/l reporting limit was used in place of the requested 0.001 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as n as replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes

☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes

☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes

☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18040261-001DMS	Total Nitrogen	88	S	90-110
H18040276-001DMS	Total Phosphorus	115	S	90-110

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes

☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☒ Yes

☐ No

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18040261-001DMS	Total Nitrogen as N	85	S	90-110
H18040276-001DMS	Total Phosphorus	118	S	90-110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.
☒ Yes
☐ No
- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).
☒ Yes
☐ No

**BLACK BUTTE COPPER WRM QA/QC REVIEW
MAY 2018
WORK ORDER #: H18050624 and H18050618**

1. INTRODUCTION

This validation applies to inorganic analyses from 23 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in May 2018. The total number of samples included 15 water samples, 4 site observations, 2 field blanks and 2 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
 - ☒ EPA CLP National Functional Guidelines for Inorganics Data Review
 - ☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
 - ☐ Contract Laboratory Program (CLP)
 - ☒ Standard
 - ☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
 - ☒ Yes
 - ☐ No
- All documentation of field procedures was provided as required.
 - ☒ Yes
 - ☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.

 - ☒ Yes
 - ☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.

 - ☒ Yes
 - ☐ No
- **Field duplicates**

Field duplicates were collected at the proper frequency.

 - ☒ Yes
 - ☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☐ Yes
☒ No – see following table

Date	Site Code	Parameter	Sample Result (mg/L)	Duplicate Result (mg/L)	Number of Flags
5/23/18	SP-7	Iron (DIS)	0.18	<0.02	$\pm$ PRDL

J – Duplicate sample exceeded QA/QC comparison control limits.

4. LABORATORY PROCEDURES

- Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- Holding times met**

☒ Yes
☐ No

- Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes
☐ No

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total dissolved solids, nitrate + nitrite as n, strontium and zinc had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Strontium had the 0.0003 mg/l reporting limit was used in place of the requested 0.0002 mg/l. Zinc had a limit of 0.003 mg/l used not the requested 0.002 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as n as replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes

☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes

☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes

☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18050468-001CMS	Aluminum	176	S	70 - 130
H18050617-001AMS	N+N	84	S	90-110

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes

☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☒ Yes

☐ No

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18050468-001CMSD	Aluminum	169	S	70 - 130
H18050617-001AMSD	N+N	88	S	90-110
H18050624-007CMSD	N+N	89	S	90-110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.
☒ Yes
☐ No
- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).
☒ Yes
☐ No

BLACK BUTTE COPPER WRM QA/QC REVIEW
JUNE 2018
WORK ORDER #: H18060369, H18060370 and H18060368

1. INTRODUCTION

This validation applies to inorganic analyses from 98 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in June 2018. The total number of samples included 50 water samples, 41 site observations, 4 field blanks and 3 field duplicates.

- Validation procedures used are generally consistent with:
 (Check all that apply)
 ☒ EPA CLP National Functional Guidelines for Inorganics Data Review
 ☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
 ☐ Contract Laboratory Program (CLP)
 ☒ Standard
 ☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
 ☒ Yes
 ☐ No
- All documentation of field procedures was provided as required.
 ☒ Yes
 ☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
 Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
 DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
 ☒ Yes
 ☐ No

 Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
 ☐ Yes
 ☒ No – see following table

Date	Parameter	Sample Result (mg/L)	Reporting Limit (mg/L)	Number of Flags
6/13/18	Hardness	1.0	<1.0	0
	DIS Strontium	0.0003	<0.0002	0
6/14/18	Hardness	1.0	<1.0	0
	DIS Strontium	0.0002	<0.0002	0

U – Blank sample exceeded QA/QC comparison control limits.

- **Field duplicates**

Field duplicates were collected at the proper frequency.

☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☒ Yes
☐ No

4. **LABORATORY PROCEDURES**

- **Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- **Holding times met**

☒ Yes
☐ No

- **Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes
☐ No

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. **DETECTION LIMITS**

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total dissolved solids, nitrate + nitrite as n, strontium and zinc had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Strontium had the 0.0003 mg/l reporting limit was used in place of the requested 0.0002 mg/l. Zinc had a limit of 0.003 mg/l used not the requested 0.002 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as n as replacement of the 0.003 mg/l requested.

6. **LABORATORY BLANKS**

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes
☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes
☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes
☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes
☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18060369-001DMS	Total Phosphorus	89	S	90-110

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes
☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☒ Yes
☐ No

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes
☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18060369-001DMSD	Total Phosphorus	88	S	90-110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.

☒ Yes
☐ No

- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).
☒ Yes
☐ No

BLACK BUTTE COPPER WRM QA/QC REVIEW
JULY 2018
WORK ORDER #: H18070565 and H18070561

1. INTRODUCTION

This validation applies to inorganic analyses from 23 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in July 2018. The total number of samples included 17 water samples, 2 site observations, 2 field blanks and 2 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
☒ EPA CLP National Functional Guidelines for Inorganics Data Review
☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
☐ Contract Laboratory Program (CLP)
☒ Standard
☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
☒ Yes
☐ No
- All documentation of field procedures was provided as required.
☒ Yes
☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
☒ Yes
☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
☒ Yes
☐ No
- **Field duplicates**
Field duplicates were collected at the proper frequency.
☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these

cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☒ Yes
☐ No

4. LABORATORY PROCEDURES

- **Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- **Holding times met**

☒ Yes
☐ No

- **Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes
☐ No

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total dissolved solids and strontium had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Strontium had the 0.0003 mg/l reporting limit was used in place of the requested 0.0002 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as n as replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes
☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes

☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes

☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18060369-001DMS	Total Phosphorus	89	S	90-110

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes

☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☒ Yes

☐ No

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18060369-001DMSD	Total Phosphorus	88	S	90-110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.

☒ Yes

☐ No

- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).

☒ Yes

☐ No

**BLACK BUTTE COPPER WRM QA/QC REVIEW
AUGUST 2018
WORK ORDER #: H18080619 and H18080620**

1. INTRODUCTION

This validation applies to inorganic analyses from 23 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in August 2018. The total number of samples included 17 water samples, 2 site observations, 2 field blanks and 2 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
 - ☒ EPA CLP National Functional Guidelines for Inorganics Data Review
 - ☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
 - ☐ Contract Laboratory Program (CLP)
 - ☒ Standard
 - ☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
 - ☒ Yes
 - ☐ No
- All documentation of field procedures was provided as required.
 - ☒ Yes
 - ☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
 - DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
 - ☒ Yes
 - ☐ No
 - Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
 - ☒ Yes
 - ☐ No
- **Field duplicates**
Field duplicates were collected at the proper frequency.
 - ☒ Yes
 - ☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☐ Yes
☒ No – see following table

Date	Site Code	Parameter	Sample Result (mg/L)	Duplicate Result (mg/L)	Number of Flags
8/28/18	SW-17	Total Suspended Solids	14	<4	19
		Total Phosphorus	0.018	0.007	7
		Total Persulfate Nitrogen	0.22	0.13	7
		Iron TRC	0.08	0.12	7
		Zinc TRC	<0.002	0.005	7

J – Duplicate sample exceeded QA/QC comparison control limits.

4. LABORATORY PROCEDURES

- Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- Holding times met**

☒ Yes
☐ No

- Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes
☐ No

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total dissolved solids and strontium had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Strontium had the 0.0003 mg/l reporting limit was used in place of the requested 0.0002 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as a replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes

☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes

☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes

☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18080620-001CMS	Nitrate + Nitrite as N	111	S	90-110
H18080645-002CMS3	Aluminum	186	S	70-130
H18080620-001CMS	Nitrate + Nitrite as N	112	S	90-110

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes

☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☒ Yes

☐ No

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18080620-001CMSD	Nitrate + Nitrite as N	113	S	90-110
H18080645-002CMS3D	Aluminum	199	S	70-130
H18080620-001CMSD	Nitrate + Nitrite as N	114	S	90-110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.
☒ Yes
☐ No
- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).
☒ Yes
☐ No

BLACK BUTTE COPPER WRM QA/QC REVIEW

SEPTEMBER 2018

WORK ORDER #: H18090466, H18090469, H18090467, H18090538 and H18090666

1. INTRODUCTION

This validation applies to inorganic analyses from 80 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in September 2018. The total number of samples included 49 water samples, 24 site observations, 4 field blanks and 3 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
☒ EPA CLP National Functional Guidelines for Inorganics Data Review
☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
☐ Contract Laboratory Program (CLP)
☒ Standard
☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
☒ Yes
☐ No
- All documentation of field procedures was provided as required.
☒ Yes
☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
☒ Yes
☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
☒ Yes
☐ No
- **Field duplicates**
Field duplicates were collected at the proper frequency.
☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☐ Yes
☒ No – see following table

Date	Site Code	Parameter	Sample Result (mg/L)	Duplicate Result (mg/L)	Number of Flags
9/18/18	SW-17	Total Phosphorus	0.088	0.006	9

J – Duplicate sample exceeded QA/QC comparison control limits.

4. LABORATORY PROCEDURES

- Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- Holding times met**

☒ Yes
☐ No

- Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes
☐ No

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total suspended solids, total dissolved solids and strontium had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l, same with TSS. Strontium had the 0.0003 mg/l reporting limit was used in place of the requested 0.0002 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as a replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes

☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes

☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes

☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18090467-010CMS	Nitrate + Nitrite as N	113	S	90-110
H18090469-006CMS	Nitrate + Nitrite as N	111	S	90-110

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes

☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18090469-001ADUP	Total Dissolved Solids	10	R	5

R –Relative Percent Difference outside of advisory limits

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18090467-010CMSD	Nitrate + Nitrite as N	112	S	90-110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.
☒ Yes
☐ No
- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).
☒ Yes
☐ No

**BLACK BUTTE COPPER WRM QA/QC REVIEW
OCTOBER 2018
WORK ORDER #: H18100607 and H18100608**

1. INTRODUCTION

This validation applies to inorganic analyses from 23 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in October 2018. The total number of samples included 23 water samples, 4 site observations, 2 field blanks and 2 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
☒ EPA CLP National Functional Guidelines for Inorganics Data Review
☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
☐ Contract Laboratory Program (CLP)
☒ Standard
☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
☒ Yes
☐ No
- All documentation of field procedures was provided as required.
☒ Yes
☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
☒ Yes
☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
☒ Yes
☐ No
- **Field duplicates**
Field duplicates were collected at the proper frequency.
☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☒ Yes
☐ No

4. LABORATORY PROCEDURES

- **Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- **Holding times met**

☒ Yes
☐ No

- **Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes – see following notes
☐ No

NOTES: It should be noted that during sample check-in the time on the raw bottle in sample set BBC-1810-105 is 14:00; time on the chain of custody is 14:1; for corrective action the laboratory used the time from the chain for sampling check-in.

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total dissolved solids and strontium had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Thallium had the 0.0003 mg/l reporting limit was used in place of the requested 0.0002 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as n as replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes
☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes
☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes
☐ No

- Matrix spike recoveries were within the lab specified control limits.

☒ Yes
☐ No

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes
☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☐ Yes
☒ No – see following table

QC Sample Id	Parameter	% RPD	Lab Flag	Lab Advisory Limits (% RPD)
H18100607-001CDIL	Strontium	23	R	10

R –Relative Percent Difference outside of advisory limits

- Matrix spike duplicate recoveries were within the lab specified control limits.

☒ Yes
☐ No

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.

☒ Yes
☐ No

- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).

☒ Yes
☐ No

**BLACK BUTTE COPPER WRM QA/QC REVIEW
NOVEMBER 2018**

**WORK ORDER #: H18110265, H18110401, H18110266, H18110350, and
H18110402**

1. INTRODUCTION

This validation applies to inorganic analyses from 111 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in November 2018. The total number of samples included 42 water samples, 62 site observations, 4 field blanks and 3 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
 - ☒ EPA CLP National Functional Guidelines for Inorganics Data Review
 - ☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
 - ☐ Contract Laboratory Program (CLP)
 - ☒ Standard
 - ☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
 - ☒ Yes
 - ☐ No
- All documentation of field procedures was provided as required.
 - ☒ Yes
 - ☐ No

3. FIELD QUALITY CONTROL SAMPLES

• **Blanks**

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.

☒ Yes
☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.

☒ Yes
☐ No

• **Field duplicates**

Field duplicates were collected at the proper frequency.

☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☐ Yes
☒ No – see following table

Date	Site Code	Parameter	Sample Result (mg/L)	Duplicate Result (mg/L)	Number of Flags
11/13/18	MW-16	Total Suspended Solids	82	57	45

J – Duplicate sample exceeded QA/QC comparison control limits.

4. LABORATORY PROCEDURES

- Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- Holding times met**

☒ Yes
☐ No

- Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes – see following notes
☐ No

NOTES: It should be noted that during sample check-in the time on the raw bottle in sample set BBC-1811-121 is 14:25; time on the chain of custody is 14:45; for corrective action the laboratory used the time from the chain of custody for sampling check-in.

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total dissolved solids and strontium had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Strontium had the 0.0003 mg/l reporting limit was used in place of the requested 0.0002 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as a replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes

☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes

☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes

☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18110307-001EMS	Total Phosphorus	119		90-110
H18110343-002BMS2	Calcium	144	S	70-130
	Magnesium	132	S	70-130
H18110402-003CMS	Nitrite + Nitrate as N	89	S	90-110

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes

☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% RPD	Lab Flag	Lab Advisory Limits (% RPD)
H18110402-020BMSD	Silver	28	R	20

R –Relative Percent Difference outside of advisory limits

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes

☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18110307-001EMSD	Total Phosphorus	121	S	90-110
H18110357-001AMSD	Sulfate	89	S	90-110
H18110343-002BMS2D	Calcium	168	S	70-130
	Magnesium	143	S	70-130
	Sodium	131	S	70-130
H18110264-001CMSD	Nitrate + Nitrite as N	89	S	90-110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.

☒ Yes

☐ No

- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).

☒ Yes

☐ No

**BLACK BUTTE COPPER WRM QA/QC REVIEW
DECEMBER 2018
WORK ORDER #: H18120295 and H18120294**

1. INTRODUCTION

This validation applies to inorganic analyses from 23 water samples collected for the Black Butte Tintina surface water and groundwater monitoring program in December 2018. The total number of samples included 11 water samples, 8 site observations, 2 field blanks and 2 field duplicates.

- Validation procedures used are generally consistent with:
(Check all that apply)
☒ EPA CLP National Functional Guidelines for Inorganics Data Review
☒ Guidance on Environmental Data Verification and Data Validation EPA QA/G-8
- Overall level of validation:
☐ Contract Laboratory Program (CLP)
☒ Standard
☐ Visual

2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW) and/or the project contract.
☒ Yes
☐ No
- All documentation of field procedures was provided as required.
☒ Yes
☐ No

3. FIELD QUALITY CONTROL SAMPLES

- **Blanks**
Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.
DI, trip, Rinsate, or any other field blanks have been carried out at the proper frequency.
☒ Yes
☐ No

Reported results on the field blanks are less than the contract required detection limits (CRDL) or the project required detection limits (PRDL) if project detection limits have been specified.
☒ Yes
☐ No
- **Field duplicates**
Field duplicates were collected at the proper frequency.
☒ Yes
☐ No

Field duplicate relative percent differences (RPD's) were within the required control limits (RPD of 20 percent or less for water matrix, 35 percent or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate result must be within $\pm$ the PRDL for water matrix, within $\pm$ 2 times the PRDL for soil matrix.

☐ Yes
☒ No – see following table

Date	Site Code	Parameter	Sample Result (mg/L)	Duplicate Result (mg/L)	Number of Flags
12/14/18	SP-4	Total Suspended Solids	23	54	13

J – Duplicate sample exceeded QA/QC comparison control limits.

4. LABORATORY PROCEDURES

- **Laboratory procedures followed**

☐ CLP-SOW
☐ SW-846
☒ Methods for Chemical Analysis of Water and Wastes
☐ XRF Standard Operating Procedures

- **Holding times met**

☒ Yes
☐ No

- **Consistency with project requirements**

Analyses were carried out as requested.

☒ Yes
☐ No

Sample Conditions met at Check-in

☒ Yes
☐ No

Project specified methods were used.

☒ Yes – see following notes
☐ No

NOTES: It should be noted that parameters were analyzed using different methods than requested; however, all methods used by the laboratory are comparable.

5. DETECTION LIMITS

Reporting detection limits met project required detection limits (PRDL).

☒ Yes – see following notes
☐ No

NOTES: It should be noted that total dissolved solids and strontium had a reporting limit increases due to sample matrix interference (D). TDS had a limit of 10 mg/l used not the requested 4 mg/l. Strontium had the 0.0003 mg/l reporting limit was used in place of the requested 0.0002 mg/l. In addition, a reporting limit of 0.01 mg/l was used for nitrate + nitrite as a replacement of the 0.003 mg/l requested.

6. LABORATORY BLANKS

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

- **Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes
☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes
☐ No

7. LABORATORY MATRIX SPIKES

- A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes
☐ No

- Matrix spike recoveries were within the lab specified control limits.

☐ Yes
☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18120292-001CMS3	Beryllium	62	S	70-130
H18120343-001CMS	Total Phosphorus	86	S	90-110

S –Percent recoveries outside of advisory limits

8. LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes
☐ No

- The laboratory duplicate relative percent differences (RPD's) were within the required control limits.

☒ Yes
☐ No

- Matrix spike duplicate recoveries were within the lab specified control limits.

☐ Yes
☒ No – see following table

QC Sample Id	Parameter	% REC	Lab Flag	Lab Advisory Limits (% REC)
H18120292-001CMS3D	Beryllium	61	S	70-130
H18120343-001CMSD	Total Phosphorus	84	S	90-110

S –Percent recoveries outside of advisory limits

9. LABORATORY CONTROL STANDARDS

- LCSs were prepared and analyzed at the proper frequency.
☒ Yes
☐ No
- LCS recoveries were within the required control limits (80-120 percent for water, within the certified range for soils).
☒ Yes
☐ No