

Chemical Analysis Report

WAS-SECT-2019-03-12-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Merrit's Mill Pond BMAP**
Request ID: **RQ-2019-03-11-22**
Customer: **WAS-SECT**
Project ID: **BMAP**

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Date Certified: 01-APR-2019 14:15



Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Merritt's Mill Pond 600 meters downstream of Jackson Blue Sp

Collection Date/Time: 03/12/2019 11:27

Field ID: G2WA0007

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2069058	EPA 180.1 Rev. 2.0	Turbidity	0.30		NTU	P360288	
	EPA 300.0 Rev. 2.1	Chloride	5.0	A	mg Cl/L	P360617	
		Sulfate	1.5	A	mg SO4/L	P360619	
	SM 2120 B	Color (true)	2.5	U	PCU	P360326	
	SM 2320 B-97	Total Alkalinity	123		mg CaCO3/L	P360895	
	SM 2540 C-97	TDS	159		mg/L	P360684	
	SM 2540 D-97	TSS	2	U	mg/L	P360660	
	SM 4500 F-C-97	Fluoride	0.044	I	mg F/L	P360902	
2069061	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P360588	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P360469	
	EPA 353.2 Rev. 2.0	NO2NO3-N	3.4		mg N/L	P360550	
	EPA 365.1 Rev. 2.0	Total-P	0.022		mg P/L	P360563	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P360752	
2069064	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P360315	
2069070	EPA 200.7 Rev. 4.4	Barium	6.5		ug/L	P360395	
		Calcium	51.1		mg/L	P360395	
		Iron	30	U	ug/L	P360395	
		Magnesium	2.61		mg/L	P360395	
		Potassium	0.46	I	mg/L	P360395	
		Sodium	2.0		mg/L	P360395	
		Zinc	5.0	U	ug/L	P360395	
	EPA 200.8 Rev. 5.4	Aluminum	5.0	U	ug/L	P360395	
		Antimony	0.050	U	ug/L	P360395	
		Arsenic	0.34		ug/L	P360395	
		Boron**	8.5		ug/L	P360395	
		Cadmium	0.020	U	ug/L	P360395	
		Chromium	1.2	I	ug/L	P360395	
		Copper	0.40	U	ug/L	P360395	
		Lead	0.20	U	ug/L	P360395	
		Nickel	0.50	U	ug/L	P360395	
		Selenium	0.20	U	ug/L	P360395	
		Silver	0.010	U	ug/L	P360395	
		Thallium	0.10	U	ug/L	P360395	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Merritt's Mill Pond mid under powerlines

Collection Date/Time: 03/12/2019 11:02

Field ID: G2WA0008

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2069059	EPA 180.1 Rev. 2.0	Turbidity	1.9	A	NTU	P360288	
	EPA 300.0 Rev. 2.1	Chloride	5.2		mg Cl/L	P360617	
		Sulfate	1.6		mg SO4/L	P360619	
		Color (true)	2.5	U	PCU	P360326	
	SM 2320 B-97	Total Alkalinity	127		mg CaCO3/L	P360895	
	SM 2540 C-97	TDS	151		mg/L	P360684	
	SM 2540 D-97	TSS	2	U	mg/L	P360660	
	SM 4500 F-C-97	Fluoride	0.048	I	mg F/L	P360902	
2069062	EPA 350.1 Rev. 2.0	Ammonia-N	0.034		mg N/L	P360588	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.20		mg N/L	P360469	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.9		mg N/L	P360550	
	EPA 365.1 Rev. 2.0	Total-P	0.021		mg P/L	P360563	
	SM 5310 B-00	Organic Carbon	0.61	I	mg C/L	P360752	
2069065	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.017		mg P/L	P360315	
2069071	EPA 200.7 Rev. 4.4	Barium	7.5		ug/L	P360395	
		Calcium	53.4		mg/L	P360395	
		Iron	30	U	ug/L	P360395	
		Magnesium	3.18		mg/L	P360395	
		Potassium	0.45	I	mg/L	P360395	
		Sodium	2.2		mg/L	P360395	
		Zinc	5.0	U	ug/L	P360395	
		Aluminum	14	I	ug/L	P360395	
		Antimony	0.050	U	ug/L	P360395	
		Arsenic	0.38		ug/L	P360395	
	EPA 200.8 Rev. 5.4	Boron**	8.9		ug/L	P360395	
		Cadmium	0.020	U	ug/L	P360395	
		Chromium	1.1	I	ug/L	P360395	
		Copper	0.40	U	ug/L	P360395	
		Lead	0.20	U	ug/L	P360395	
		Nickel	0.50	U	ug/L	P360395	
		Selenium	0.23	I	ug/L	P360395	
		Silver	0.010	U	ug/L	P360395	
		Thallium	0.12	I	ug/L	P360395	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Merritt's Mill Pond 500 meters upstream of dam Collection Date/Time: 03/12/2019 09:27

Field ID: G2WA0009

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2069060	EPA 180.1 Rev. 2.0	Turbidity	1.0		NTU	P360288	
	EPA 300.0 Rev. 2.1	Chloride	5.3		mg Cl/L	P360617	
		Sulfate	1.5		mg SO4/L	P360619	
		Color (true)	4.0	I	PCU	P360326	
	SM 2320 B-97	Total Alkalinity	125		mg CaCO3/L	P360895	
	SM 2540 C-97	TDS	141	A	mg/L	P360685	
	SM 2540 D-97	TSS	2	I	mg/L	P360660	
	SM 4500 F-C-97	Fluoride	0.049	I	mg F/L	P360902	
2069063	EPA 350.1 Rev. 2.0	Ammonia-N	0.046		mg N/L	P360588	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.24		mg N/L	P360537	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.6		mg N/L	P360551	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P360534	
	SM 5310 B-00	Organic Carbon	0.98	I	mg C/L	P360752	
2069066	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.011		mg P/L	P360315	
2069072	EPA 200.7 Rev. 4.4	Barium	8.0		ug/L	P360395	
		Calcium	52.0		mg/L	P360395	
		Iron	51	I	ug/L	P360395	
		Magnesium	3.21		mg/L	P360395	
		Potassium	0.46	I	mg/L	P360395	
		Sodium	2.3		mg/L	P360395	
		Zinc	5.0	U	ug/L	P360395	
	EPA 200.8 Rev. 5.4	Aluminum	14	I	ug/L	P360395	
		Antimony	0.050	U	ug/L	P360395	
		Arsenic	0.38		ug/L	P360395	
		Boron**	9.4		ug/L	P360395	
		Cadmium	0.020	U	ug/L	P360395	
		Chromium	1.0	I	ug/L	P360395	
		Copper	0.40	U	ug/L	P360395	
		Lead	0.20	U	ug/L	P360395	
		Nickel	0.50	U	ug/L	P360395	
		Selenium	0.20	U	ug/L	P360395	
		Silver	0.010	U	ug/L	P360395	
		Thallium	0.10	U	ug/L	P360395	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P360288

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P360395

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P360395

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P360617

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P360619

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P360588

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360469

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360537

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360550

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360551

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360534

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360563

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360315

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: SM 2120 B
Batch ID: P360326

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P360895

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO3/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P360684

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P360685

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P360660

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P360902

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P360752

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P360395

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	104		P	85 - 115
Calcium	98.8		P	85 - 115
Iron	105		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	99.8		P	85 - 115
Sodium	103		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P360395

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	104		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	107		P	85 - 115
Boron	102		P	85 - 115
Cadmium	104		P	85 - 115
Chromium	105		P	85 - 115
Copper	103		P	85 - 115
Lead	103		P	85 - 115
Nickel	103		P	85 - 115
Selenium	105		P	85 - 115
Silver	100		P	85 - 115
Thallium	98.3		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P360617

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P360619

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P360588

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	100		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P360469

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360537

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	102		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360550

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	100		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360551

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	100		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360534

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360563

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	105		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360315

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	101		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P360326

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	104		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P360895

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P360902

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.1		P	91 - 105

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P360752

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.2		P	85 - 115

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P360395

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068882	Barium	104		P	80 - 120
2068882	Calcium	101		P	80 - 120
2068882	Iron	107		P	80 - 120
2068882	Magnesium	102		P	80 - 120
2068882	Potassium	99.5		P	80 - 120
2068882	Sodium	98.5		P	80 - 120
2068882	Zinc	104		P	80 - 120
2069070	Barium	103	101	P/P	80 - 120
2069070	Calcium	102		P	80 - 120
2069070	Iron	104	104	P/P	80 - 120
2069070	Magnesium	107	106	P/P	80 - 120
2069070	Potassium	98.3	96.9	P/P	80 - 120
2069070	Sodium	102	98.7	P/P	80 - 120
2069070	Zinc	105	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P360395

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068882	Aluminum	101		P	80 - 120
2068882	Antimony	105		P	80 - 120
2068882	Arsenic	109		P	80 - 120
2068882	Boron	102		P	80 - 120
2068882	Cadmium	107		P	80 - 120
2068882	Chromium	102		P	80 - 120
2068882	Copper	100		P	80 - 120
2068882	Lead	103		P	80 - 120
2068882	Nickel	101		P	80 - 120
2068882	Selenium	105		P	80 - 120
2068882	Silver	100		P	80 - 120
2068882	Thallium	101		P	80 - 120
2069070	Aluminum	101	101	P/P	80 - 120
2069070	Antimony	103	103	P/P	80 - 120
2069070	Arsenic	108	107	P/P	80 - 120
2069070	Boron	106	101	P/P	80 - 120
2069070	Cadmium	105	105	P/P	80 - 120
2069070	Chromium	103	103	P/P	80 - 120
2069070	Copper	101	100	P/P	80 - 120
2069070	Lead	101	101	P/P	80 - 120
2069070	Nickel	101	101	P/P	80 - 120
2069070	Selenium	104	103	P/P	80 - 120
2069070	Silver	100	100	P/P	80 - 120
2069070	Thallium	97.6	99.6	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P360617

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069058	Chloride	103		P	90 - 110
2069102	Chloride	105		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P360619

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069058	Sulfate	103		P	90 - 110
2069102	Sulfate	105		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360588

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069061	Ammonia-N	99.7	99.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360469

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068971	Kjeldahl Nitrogen	95.4	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360537

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069107	Kjeldahl Nitrogen	108	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360550

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069050	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360551

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069429	NO2NO3-N	99.0	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360534

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069106	Total-P	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360563

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069062	Total-P	106	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360315

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2068958	O-Phosphate-P	93.0	94.0	P/P	90 - 110

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P360902

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069078	Fluoride	93.6	95.2	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P360752

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2069108	Organic Carbon	97.6	96.5	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P360288

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069059	Turbidity	2.12	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P360395

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069070	Barium	1.98	Spike	P	0 - 20
2069070	Calcium	0.247	Spike	P	0 - 20
2069070	Iron	0.156	Spike	P	0 - 20
2069070	Magnesium	0.780	Spike	P	0 - 20
2069070	Potassium	1.26	Spike	P	0 - 20
2069070	Sodium	1.98	Spike	P	0 - 20
2069070	Zinc	2.62	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P360395

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069070	Aluminum	0.260	Spike	P	0 - 20
2069070	Antimony	0.174	Spike	P	0 - 20
2069070	Arsenic	0.365	Spike	P	0 - 20
2069070	Boron	4.92	Spike	P	0 - 20
2069070	Cadmium	0.0979	Spike	P	0 - 20
2069070	Chromium	0.535	Spike	P	0 - 20
2069070	Copper	0.356	Spike	P	0 - 20
2069070	Lead	0.134	Spike	P	0 - 20
2069070	Nickel	0.166	Spike	P	0 - 20
2069070	Selenium	0.437	Spike	P	0 - 20
2069070	Silver	0.401	Spike	P	0 - 20
2069070	Thallium	2.06	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P360617

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069058	Chloride	0.819	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P360619

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069058	Sulfate	1.43	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P360588

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069061	Ammonia-N	0.406	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360469

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068971	Kjeldahl Nitrogen	3.16	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P360537

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069107	Kjeldahl Nitrogen	3.77	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360550

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069050	NO2NO3-N	0.491	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P360551

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069429	NO2NO3-N	1.01	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360534

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069106	Total-P	0.109	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P360563

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069062	Total-P	2.42	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P360315

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068958	O-Phosphate-P	1.00	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
 Batch ID: P360326

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068954	Color (true)	1.79	Sample	P	0 - 20

Reference Method: SM 2320 B-97
 Batch ID: P360895

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069078	Total Alkalinity	0.869	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
 Batch ID: P360684

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2068275	TDS	0.758	Sample	P	0 - 10

Reference Method: SM 2540 C-97
 Batch ID: P360685

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069060	TDS	2.84	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P360902

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069078	Fluoride	1.47	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
 Batch ID: P360752

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2069108	Organic Carbon	1.08	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
 Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A89962

Included Lab Sample IDs: 2069058, 2069059, 2069060

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	100	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A89974

Included Lab Sample IDs: 2069064, 2069065, 2069066

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.4	98.7	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A89978

Included Lab Sample IDs: 2069058, 2069059, 2069060

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	102	P/P	90 - 115

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A90019

Included Lab Sample IDs: 2069070, 2069071, 2069072

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	105	105	P/P	90 - 110
Calcium	106	104	P/P	90 - 110
Iron	107	106	P/P	90 - 110
Magnesium	107	105	P/P	90 - 110
Potassium	102	101	P/P	90 - 110
Sodium	102	101	P/P	90 - 110
Zinc	107	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A90029

Included Lab Sample IDs: 2069061, 2069062, 2069063

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	101	P/P	90 - 110
NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A90056

Included Lab Sample IDs: 2069061, 2069062, 2069063

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	99.9	P/P	90 - 110
Ammonia-N	99.9	99.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A90069

Included Lab Sample IDs: 2069061, 2069062

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	106	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A90071

Included Lab Sample IDs: 2069058, 2069059, 2069060

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	99.5	P/P	90 - 110
Sulfate	103	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90074

Included Lab Sample IDs: 2069070, 2069071, 2069072

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	99.7	P/P	90 - 110
Aluminum	99.7	100	P/P	90 - 110
Antimony	97.2	98.2	P/P	90 - 110
Antimony	98.2	97.3	P/P	90 - 110
Arsenic	100	101	P/P	90 - 110
Arsenic	101	100	P/P	90 - 110
Boron	97.1	98.1	P/P	90 - 110
Boron	98.1	97.6	P/P	90 - 110
Cadmium	97.5	98.3	P/P	90 - 110
Cadmium	98.3	97.6	P/P	90 - 110
Chromium	100	101	P/P	90 - 110
Chromium	98.8	100	P/P	90 - 110
Copper	99.7	99.8	P/P	90 - 110
Copper	99.8	99.5	P/P	90 - 110
Lead	99.3	99.9	P/P	90 - 110
Lead	99.5	99.3	P/P	90 - 110
Nickel	98.7	99.2	P/P	90 - 110
Nickel	99.2	98.7	P/P	90 - 110
Selenium	98.6	98.7	P/P	90 - 110
Selenium	98.9	98.6	P/P	90 - 110
Silver	95.0	95.2	P/P	90 - 110
Silver	95.2	94.8	P/P	90 - 110
Thallium	92.4	92.4	P/P	90 - 110
Thallium	92.4	92.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A90090

Included Lab Sample IDs: 2069063

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	101	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A90118

Included Lab Sample IDs: 2069061, 2069062, 2069063

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.2	93.9	P/P	90 - 110
Organic Carbon	93.9	94.4	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A90147

Included Lab Sample IDs: 2069063

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	100	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A90183

Included Lab Sample IDs: 2069058, 2069059, 2069060

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.9	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A90183

Included Lab Sample IDs: 2069058, 2069059, 2069060

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A90185

Included Lab Sample IDs: 2069061, 2069062

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	102	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision	
						LCS	SMP MS
EPA 180.1 Rev. 2.0	Turbidity						2.12
EPA 200.7 Rev. 4.4	Barium	104	104	103	101		1.98
	Calcium	98.8	101	102			0.247
	Iron	105	107	104	104		0.156
	Magnesium	107	102	107	106		0.780
	Potassium	99.8	99.5	98.3	96.9		1.26
	Sodium	103	98.5	102	98.7		1.98
	Zinc	102	104	105	102		2.62
EPA 200.8 Rev. 5.4	Aluminum	104	101	101	101		0.260
	Antimony	102	105	103	103		0.174
	Arsenic	107	109	108	107		0.365
	Boron	102	102	106	101		4.92
	Cadmium	104	107	105	105		0.0979
	Chromium	105	102	103	103		0.535
	Copper	103	100	101	100		0.356
	Lead	103	103	101	101		0.134
	Nickel	103	101	101	101		0.166
	Selenium	105	105	104	103		0.437
	Silver	100	100	100	100		0.401
	Thallium	98.3	101	97.6	99.6		2.06
EPA 300.0 Rev. 2.1	Chloride	101	103	105			0.819
	Sulfate	103	103	105			1.43
EPA 350.1 Rev. 2.0	Ammonia-N	100	99.7	99.3			0.406
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	95.4	101			3.16
	Kjeldahl Nitrogen	102	108	104			3.77
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	102	102			0.491
	NO ₂ NO ₃ -N	100	99.0	100			1.01
EPA 365.1 Rev. 2.0	Total-P	102	101	101			0.109
	Total-P	105	106	103			2.42
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	93.0	94.0			1.00
SM 2120 B	Color (true)	104					1.79
SM 2320 B-97	Total Alkalinity	101					0.869
SM 2540 C-97	TDS						0.758
	TDS						2.84
SM 4500 F-C-97	Fluoride	98.1	93.6	95.2			1.47
SM 5310 B-00	Organic Carbon	96.2	97.6	96.5			1.08

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2069058, 2069059, 2069060
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2069070, 2069071, 2069072
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2069070, 2069071, 2069072
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2069058, 2069059, 2069060
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2069058, 2069059, 2069060
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2069061, 2069062, 2069063
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2069061, 2069062, 2069063

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2069061, 2069062, 2069063
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2069061, 2069062, 2069063
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2069064, 2069065, 2069066
SM 2120 B / E31780	True Color measured at 450 nm	2069058, 2069059, 2069060
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2069058, 2069059, 2069060
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2069058, 2069059, 2069060
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2069058, 2069059, 2069060
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2069058, 2069059, 2069060
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2069061, 2069062, 2069063

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	03/12/2019			03/12/2019 16:50	Adrian Shelby	2069058, 2069059, 2069060
EPA 200.7 Rev. 4.4	03/12/2019	03/13/2019 17:35	Elliott D. Healy	03/14/2019 18:13	Betina Topolski	2069070
	03/12/2019	03/13/2019 17:35	Elliott D. Healy	03/14/2019 18:39	Betina Topolski	2069071
	03/12/2019	03/13/2019 17:35	Elliott D. Healy	03/14/2019 18:47	Betina Topolski	2069072
EPA 200.8 Rev. 5.4	03/12/2019	03/13/2019 17:35	Elliott D. Healy	03/16/2019 11:32	Allison Taylor	2069070
	03/12/2019	03/13/2019 17:35	Elliott D. Healy	03/16/2019 12:00	Allison Taylor	2069071
	03/12/2019	03/13/2019 17:35	Elliott D. Healy	03/16/2019 12:38	Allison Taylor	2069072
EPA 300.0 Rev. 2.1	03/12/2019			03/19/2019 01:40	Lipi Saha	2069058
	03/12/2019			03/19/2019 02:52	Lipi Saha	2069059
	03/12/2019			03/19/2019 03:04	Lipi Saha	2069060
EPA 350.1 Rev. 2.0	03/12/2019			03/15/2019 13:12	Ping Hua	2069061
	03/12/2019			03/15/2019 13:26	Ping Hua	2069062
	03/12/2019			03/15/2019 13:27	Ping Hua	2069063
EPA 351.2 Rev. 2.0	03/12/2019	03/14/2019 12:17	Adrian Shelby	03/15/2019 16:21	Joseph Suarez	2069061
	03/12/2019	03/14/2019 12:17	Adrian Shelby	03/15/2019 16:23	Joseph Suarez	2069062
	03/12/2019	03/15/2019 16:30	Adrian Shelby	03/19/2019 10:12	Joseph Suarez	2069063
EPA 353.2 Rev. 2.0	03/12/2019			03/15/2019 10:16	Beverly Y. Sanders	2069061
	03/12/2019			03/15/2019 10:17	Beverly Y. Sanders	2069062
	03/12/2019			03/15/2019 10:24	Beverly Y. Sanders	2069063
EPA 365.1 Rev. 2.0	03/12/2019	03/15/2019 14:20	Sima Feizi	03/19/2019 13:47	Beverly Y. Sanders	2069063
	03/12/2019	03/18/2019 14:30	Sima Feizi	03/21/2019 13:21	Beverly Y. Sanders	2069062
	03/12/2019	03/18/2019 14:30	Sima Feizi	03/21/2019 13:22	Beverly Y. Sanders	2069061
EPA 365.1 Rev. 2.0 dissolved	03/12/2019			03/12/2019 18:59	Jhamieka S. Greenwood	2069064
	03/12/2019			03/12/2019 19:00	Jhamieka S. Greenwood	2069065, 2069066
SM 2120 B	03/12/2019			03/12/2019 16:21	Mariam Hanna	2069058
	03/12/2019			03/12/2019 16:22	Mariam Hanna	2069059
	03/12/2019			03/12/2019 16:23	Mariam Hanna	2069060
SM 2320 B-97	03/12/2019			03/21/2019 07:20	Dale L. Simmons	2069058
	03/12/2019			03/21/2019 07:32	Dale L. Simmons	2069059
	03/12/2019			03/21/2019 07:44	Dale L. Simmons	2069060
SM 2540 C-97	03/12/2019			03/13/2019 14:03	Yijie Li	2069058, 2069059, 2069060
SM 2540 D-97	03/12/2019			03/13/2019 14:03	Yijie Li	2069058, 2069059, 2069060
SM 4500 F-C-97	03/12/2019			03/21/2019 07:20	Dale L. Simmons	2069058
	03/12/2019			03/21/2019 07:32	Dale L. Simmons	2069059
	03/12/2019			03/21/2019 07:44	Dale L. Simmons	2069060
SM 5310 B-00	03/12/2019			03/19/2019 03:58	Julia Storbeck	2069061
	03/12/2019			03/19/2019 06:41	Julia Storbeck	2069062
	03/12/2019			03/19/2019 06:54	Julia Storbeck	2069063