

Chemical Analysis Report

WAS-SECT-2018-06-20-02

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

Event Description: **Merrits Mill Pond BMAP**

Request ID: **RQ-2018-06-18-24**

Customer: **WAS-SECT**

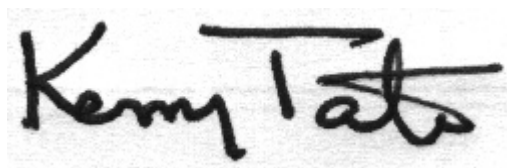
Project ID: **BMAP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Curtis Musson

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 13-JUL-2018 13:38

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the first name.

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 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 Spring **Collection Date/Time: 06/20/2018 11:30**

Field ID: G2WA0007

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2002385	EPA 180.1 Rev. 2.0	Turbidity	0.25		NTU	P347293	
	EPA 300.0 Rev. 2.1	Chloride	4.6	A	mg Cl/L	P347540	
		Sulfate	1.3	A	mg SO4/L	P347544	
		Color (true)	2.5	U	PCU	P347239	
	SM 2320 B-97	Total Alkalinity	122	A	mg CaCO3/L	P347842	
	SM 2540 C-97	TDS	160		mg/L	P347759	
	SM 2540 D-97	TSS	2	U	mg/L	P347733	
	SM 4500 F-C-97	Fluoride	0.038	I	mg F/L	P347846	
2002388	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P347352	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.15	I	mg N/L	P348068	
	EPA 353.2 Rev. 2.0	NO2NO3-N	3.6		mg N/L	P347512	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P347559	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P347697	
2002391	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.014		mg P/L	P347287	
2002397	EPA 200.7 Rev. 4.4	Calcium	52.5		mg/L	P347444	
		Iron	30	U	ug/L	P347444	
		Magnesium	2.79		mg/L	P347444	
		Potassium	0.43	I	mg/L	P347444	
		Sodium	2.0	I	mg/L	P347444	
	EPA 200.8 Rev. 5.4	Zinc	9.3	I	ug/L	P347444	
		Arsenic	0.25		ug/L	P347444	
		Cadmium	0.020	U	ug/L	P347444	
		Chromium	1.1	I	ug/L	P347444	
		Copper	0.20	U	ug/L	P347444	
		Lead	0.062	I	ug/L	P347444	
		Nickel	0.20	U	ug/L	P347444	
		Silver	0.010	U	ug/L	P347444	

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: 06/20/2018 12:00

Field ID: G2WA0008

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2002386	EPA 180.1 Rev. 2.0	Turbidity	0.70		NTU	P347293	
	EPA 300.0 Rev. 2.1	Chloride	4.9		mg Cl/L	P347540	
		Sulfate	1.4		mg SO4/L	P347544	
		Color (true)	2.5	U	PCU	P347239	
	SM 2320 B-97	Total Alkalinity	121		mg CaCO3/L	P347842	
	SM 2540 C-97	TDS	154		mg/L	P347760	
	SM 2540 D-97	TSS	2	I	mg/L	P347734	
	SM 4500 F-C-97	Fluoride	0.040	I	mg F/L	P347846	
2002389	EPA 350.1 Rev. 2.0	Ammonia-N	0.072		mg N/L	P347555	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.27		mg N/L	P348068	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.7		mg N/L	P347512	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P347559	
	SM 5310 B-00	Organic Carbon	0.78	I	mg C/L	P347697	
2002392	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.010		mg P/L	P347287	
2002398	EPA 200.7 Rev. 4.4	Calcium	50.3		mg/L	P347444	
		Iron	30	U	ug/L	P347444	
		Magnesium	3.05		mg/L	P347444	
		Potassium	0.36	I	mg/L	P347444	
		Sodium	2.1		mg/L	P347444	
		Zinc	5.0	U	ug/L	P347444	
	EPA 200.8 Rev. 5.4	Arsenic	0.29		ug/L	P347444	
		Cadmium	0.020	U	ug/L	P347444	
		Chromium	0.86	I	ug/L	P347444	
		Copper	0.20	U	ug/L	P347444	
		Lead	0.050	U	ug/L	P347444	
		Nickel	0.20	U	ug/L	P347444	
		Silver	0.010	U	ug/L	P347444	

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: 06/20/2018 12:25

Field ID: G2WA0009

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2002387	EPA 180.1 Rev. 2.0	Turbidity	0.75		NTU	P347293	
	EPA 300.0 Rev. 2.1	Chloride	4.8		mg Cl/L	P347540	
		Sulfate	1.3		mg SO4/L	P347544	
		Color (true)	9.9	A	PCU	P347240	
	SM 2320 B-97	Total Alkalinity	114		mg CaCO3/L	P347842	
	SM 2540 C-97	TDS	142	A	mg/L	P347760	
	SM 2540 D-97	TSS	4	IA	mg/L	P347734	
	SM 4500 F-C-97	Fluoride	0.039	I	mg F/L	P347846	
2002390	EPA 350.1 Rev. 2.0	Ammonia-N	0.050		mg N/L	P347555	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.40		mg N/L	P348068	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.3		mg N/L	P347512	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P347559	
	SM 5310 B-00	Organic Carbon	1.9		mg C/L	P347697	
2002393	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P347287	
2002399	EPA 200.7 Rev. 4.4	Calcium	47.5		mg/L	P347444	
		Iron	53	I	ug/L	P347444	
		Magnesium	3.01		mg/L	P347444	
		Potassium	0.41	I	mg/L	P347444	
		Sodium	2.1		mg/L	P347444	
		Zinc	5.0	U	ug/L	P347444	
	EPA 200.8 Rev. 5.4	Arsenic	0.34		ug/L	P347444	
		Cadmium	0.020	U	ug/L	P347444	
		Chromium	0.72	I	ug/L	P347444	
		Copper	0.20	U	ug/L	P347444	
		Lead	0.050	U	ug/L	P347444	
		Nickel	0.20	U	ug/L	P347444	
		Silver	0.010	U	ug/L	P347444	

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: P347293

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P347444

Component	Result	Code	Units
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: P347444

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347540

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347544

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347352

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347555

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: P348068

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P347512

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P347559

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347287

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

Reference Method: SM 2120 B
Batch ID: P347239

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P347240

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P347842

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-97
Batch ID: P347759

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P347760

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P347733

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P347734

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P347846

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P347697

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: P347444

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	104		P	85 - 115
Magnesium	109		P	85 - 115
Potassium	102		P	85 - 115
Sodium	104		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P347444

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	101		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	99.1		P	85 - 115
Copper	98.6		P	85 - 115
Lead	98.4		P	85 - 115
Nickel	100		P	85 - 115
Silver	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347540

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347544

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347352

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347555

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.7		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348068

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P347512

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P347559

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	95.9		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347287

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.1		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P347842

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P347846

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.8		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P347697

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P347444

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002397	Calcium	103		P	80 - 120
2002397	Iron	105		P	80 - 120
2002397	Magnesium	109		P	80 - 120
2002397	Potassium	105		P	80 - 120
2002397	Sodium	108		P	80 - 120
2002397	Zinc	99.6		P	80 - 120
2002399	Calcium	101		P	80 - 120
2002399	Iron	105	104	P/P	80 - 120
2002399	Magnesium	109	105	P/P	80 - 120
2002399	Potassium	103	102	P/P	80 - 120
2002399	Sodium	107	104	P/P	80 - 120
2002399	Zinc	101	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P347444

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002397	Arsenic	101		P	80 - 120
2002397	Cadmium	102		P	80 - 120
2002397	Chromium	96.3		P	80 - 120
2002397	Copper	93.6		P	80 - 120
2002397	Lead	98.1		P	80 - 120
2002397	Nickel	96.2		P	80 - 120
2002397	Silver	102		P	80 - 120
2002399	Arsenic	101	100	P/P	80 - 120
2002399	Cadmium	103	101	P/P	80 - 120
2002399	Chromium	97.4	95.7	P/P	80 - 120
2002399	Copper	94.2	93.3	P/P	80 - 120
2002399	Lead	98.0	97.5	P/P	80 - 120
2002399	Nickel	97.1	95.8	P/P	80 - 120
2002399	Silver	101	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P347540

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002385	Chloride	100		P	90 - 110
2002419	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P347544

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002385	Sulfate	101		P	90 - 110
2002419	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P347352

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002230	Ammonia-N	101	101	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347555

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002389	Ammonia-N	93.1	95.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348068

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002423	Kjeldahl Nitrogen	97.6	92.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P347512

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002248	NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P347559

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002389	Total-P	96.3	94.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347287

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002391	O-Phosphate-P	99.0	99.6	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P347846

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002385	Fluoride	96.3	96.3	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P347697

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2002390	Organic Carbon	94.6	95.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P347293

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002405	Turbidity	10.5	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P347444

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002399	Calcium	1.34	Spike	P	0 - 20
2002399	Iron	1.21	Spike	P	0 - 20
2002399	Magnesium	2.10	Spike	P	0 - 20
2002399	Potassium	0.862	Spike	P	0 - 20
2002399	Sodium	1.38	Spike	P	0 - 20
2002399	Zinc	0.310	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P347444

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002399	Arsenic	0.480	Spike	P	0 - 20
2002399	Cadmium	1.31	Spike	P	0 - 20
2002399	Chromium	1.70	Spike	P	0 - 20
2002399	Copper	0.927	Spike	P	0 - 20
2002399	Lead	0.538	Spike	P	0 - 20
2002399	Nickel	1.41	Spike	P	0 - 20
2002399	Silver	0.671	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347540

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002385	Chloride	5.52	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P347544

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002385	Sulfate	5.84	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347352

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002230	Ammonia-N	0.0562	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P347555

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002389	Ammonia-N	0.848	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P348068

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002423	Kjeldahl Nitrogen	5.35	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P347512

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002248	NO2NO3-N	0.496	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P347559

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002389	Total-P	2.14	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P347287

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002391	O-Phosphate-P	0.531	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P347239

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002093	Color (true)	0.148	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P347240

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002387	Color (true)	0.689	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P347842

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002385	Total Alkalinity	0.588	Sample	P	0 - 1.6

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P347759

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002246	TDS	5.83	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P347760

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002387	TDS	4.23	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P347846

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002385	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P347697

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2002390	Organic Carbon	0.958	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: SM 2120 B

Run ID: A84740

Included Lab Sample IDs: 2002385, 2002386, 2002387

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	101	P/P	90 - 115
Color (true)	101		P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A84758

Included Lab Sample IDs: 2002391, 2002392, 2002393

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	100	P/P	90 - 110
O-Phosphate-P	100	101	P/P	90 - 110
O-Phosphate-P	100	99.5	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A84760

Included Lab Sample IDs: 2002385, 2002386, 2002387

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	98.5	P/P	95 - 105

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A84777

Included Lab Sample IDs: 2002388

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A84842

Included Lab Sample IDs: 2002388, 2002389, 2002390

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A84847

Included Lab Sample IDs: 2002385, 2002386, 2002387

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.8	102	P/P	90 - 110
Sulfate	100	103	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A84850

Included Lab Sample IDs: 2002397, 2002398, 2002399

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	104	P/P	90 - 110
Iron	103	102	P/P	90 - 110
Magnesium	104	104	P/P	90 - 110
Potassium	102	101	P/P	90 - 110
Sodium	102	104	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A84850

Included Lab Sample IDs: 2002397, 2002398, 2002399

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Zinc	102	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A84852

Included Lab Sample IDs: 2002389, 2002390

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.3	97.5	P/P	90 - 110
Ammonia-N	97.5	96.5	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A84915

Included Lab Sample IDs: 2002388, 2002389, 2002390

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.2	97.8	P/P	90 - 110
Organic Carbon	96.4	96.2	P/P	90 - 110
Organic Carbon	97.2	96.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A84947

Included Lab Sample IDs: 2002397, 2002398, 2002399

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	96.8	94.4	P/P	90 - 110
Cadmium	96.3	94.8	P/P	90 - 110
Chromium	96.2	93.9	P/P	90 - 110
Copper	95.8	93.4	P/P	90 - 110
Lead	95.4	94.6	P/P	90 - 110
Nickel	94.8	92.5	P/P	90 - 110
Silver	97.4	95.9	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A84969

Included Lab Sample IDs: 2002385, 2002386, 2002387

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	103	P/P	90 - 110
Total Alkalinity	104	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A84969

Included Lab Sample IDs: 2002385, 2002386, 2002387

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	101	100	P/P	90 - 110
Fluoride	99.5	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A84970

Included Lab Sample IDs: 2002388, 2002389, 2002390

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.2	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A85111

Included Lab Sample IDs: 2002388, 2002389, 2002390

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	96.7	P/P	90 - 110
Kjeldahl Nitrogen	103	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					10.5	
EPA 200.7 Rev. 4.4	Calcium	104	103	101			1.34
	Iron	104	105	105	104		1.21
	Magnesium	109	109	109	105		2.10
	Potassium	102	105	103	102		0.862
	Sodium	104	108	107	104		1.38
	Zinc	104	99.6	101	102		0.310
EPA 200.8 Rev. 5.4	Arsenic	101	101	101	100		0.480
	Cadmium	102	102	103	101		1.31
	Chromium	99.1	96.3	97.4	95.7		1.70
	Copper	98.6	93.6	94.2	93.3		0.927
	Lead	98.4	98.1	98.0	97.5		0.538
	Nickel	100	96.2	97.1	95.8		1.41
	Silver	103	102	101	101		0.671
EPA 300.0 Rev. 2.1	Chloride	100	100	102		5.52	
	Sulfate	100	101	101		5.84	
EPA 350.1 Rev. 2.0	Ammonia-N	101	101	101			0.0562
	Ammonia-N	98.7	93.1	95.1			0.848
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	97.6	92.2			5.35
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	101	100			0.496
EPA 365.1 Rev. 2.0	Total-P	95.9	96.3	94.2			2.14
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	99.0	99.6			0.531
SM 2120 B	Color (true)					0.148	
	Color (true)					0.689	
SM 2320 B-97	Total Alkalinity	102				0.588	
SM 2540 C-97	TDS					5.83	
	TDS					4.23	
SM 4500 F-C-97	Fluoride	98.8	96.3	96.3			0.0
SM 5310 B-00	Organic Carbon	99.2	94.6	95.6			0.958

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2002385, 2002386, 2002387
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2002397, 2002398, 2002399
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2002397, 2002398, 2002399
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2002385, 2002386, 2002387
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2002385, 2002386, 2002387
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2002388, 2002389, 2002390
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2002388, 2002389, 2002390
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2002388, 2002389, 2002390
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2002388, 2002389, 2002390
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2002391, 2002392, 2002393
SM 2120 B / E31780	True Color measured at 450 nm	2002385, 2002386, 2002387
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2002385, 2002386, 2002387

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2002385, 2002386, 2002387
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2002385, 2002386, 2002387
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2002385, 2002386, 2002387
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2002388, 2002389, 2002390

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	06/20/2018			06/21/2018 17:00	William L. Brown IV	2002385, 2002386, 2002387
EPA 200.7 Rev. 4.4	06/20/2018	06/25/2018 14:00	Elliott D. Healy	06/26/2018 18:00	Betina Topolski	2002397
	06/20/2018	06/25/2018 14:00	Elliott D. Healy	06/26/2018 18:20	Betina Topolski	2002398
	06/20/2018	06/25/2018 14:00	Elliott D. Healy	06/26/2018 18:27	Betina Topolski	2002399
EPA 200.8 Rev. 5.4	06/20/2018	06/25/2018 14:00	Elliott D. Healy	06/29/2018 13:37	Robert K Palmer	2002397
	06/20/2018	06/25/2018 14:00	Elliott D. Healy	06/29/2018 13:56	Robert K Palmer	2002398
	06/20/2018	06/25/2018 14:00	Elliott D. Healy	06/29/2018 14:05	Robert K Palmer	2002399
EPA 300.0 Rev. 2.1	06/20/2018			06/26/2018 04:14	Lipi Saha	2002385
	06/20/2018			06/26/2018 05:02	Lipi Saha	2002386
	06/20/2018			06/26/2018 05:14	Lipi Saha	2002387
EPA 350.1 Rev. 2.0	06/20/2018			06/22/2018 12:31	Ping Hua	2002388
	06/20/2018			06/26/2018 12:37	Adrian Shelby	2002389
	06/20/2018			06/26/2018 12:48	Adrian Shelby	2002390
EPA 351.2 Rev. 2.0	06/20/2018	07/09/2018 10:25	Tanya Welborn	07/10/2018 09:41	Joseph Suarez	2002388
	06/20/2018	07/09/2018 10:25	Tanya Welborn	07/10/2018 09:46	Joseph Suarez	2002389
	06/20/2018	07/09/2018 10:25	Tanya Welborn	07/10/2018 09:47	Joseph Suarez	2002390
EPA 353.2 Rev. 2.0	06/20/2018			06/26/2018 14:53	Lauren Bottorf	2002388
	06/20/2018			06/26/2018 14:55	Lauren Bottorf	2002389
	06/20/2018			06/26/2018 14:56	Lauren Bottorf	2002390
EPA 365.1 Rev. 2.0	06/20/2018	06/26/2018 12:45	Sima Feizi	07/02/2018 14:13	Beverly Y. Sanders	2002388
	06/20/2018	06/26/2018 12:45	Sima Feizi	07/02/2018 14:14	Beverly Y. Sanders	2002389
	06/20/2018	06/26/2018 12:45	Sima Feizi	07/02/2018 14:15	Beverly Y. Sanders	2002390
EPA 365.1 Rev. 2.0 dissolved	06/20/2018			06/21/2018 14:52	Megan Treadwell	2002391
	06/20/2018			06/21/2018 15:24	Megan Treadwell	2002392
	06/20/2018			06/21/2018 15:29	Megan Treadwell	2002393
SM 2120 B	06/20/2018			06/21/2018 09:46	Tanya Welborn	2002385, 2002386
	06/20/2018			06/21/2018 09:55	Tanya Welborn	2002387
SM 2320 B-97	06/20/2018			07/01/2018 21:35	Dale L. Simmons	2002385
	06/20/2018			07/01/2018 22:57	Dale L. Simmons	2002386
	06/20/2018			07/01/2018 23:09	Dale L. Simmons	2002387
SM 2540 C-97	06/20/2018			06/22/2018 15:45	Yijie Li	2002385, 2002386, 2002387
SM 2540 D-97	06/20/2018			06/22/2018 15:45	Yijie Li	2002385, 2002386, 2002387
SM 4500 F-C-97	06/20/2018			07/01/2018 21:28	Dale L. Simmons	2002385
	06/20/2018			07/01/2018 22:57	Dale L. Simmons	2002386
	06/20/2018			07/01/2018 23:09	Dale L. Simmons	2002387
SM 5310 B-00	06/20/2018			06/27/2018 16:23	Julia Storbeck	2002390
	06/20/2018			06/27/2018 21:18	Julia Storbeck	2002388
	06/20/2018			06/27/2018 22:05	Julia Storbeck	2002389