

Chemical Analysis Report

CEN-DIST-2020-08-28-02

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

Event Description: **Puzzle Lake Drain/Ruth/Florence**
Request ID: **RQ-2020-08-24-51**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:

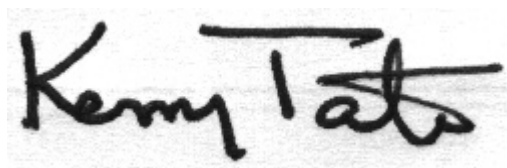
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Kalina Warren

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: 21-SEP-2020 10:25

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 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: Saint Johns River @ 300m Downstream of
 Hatbill Park Ramp**

Collection Date/Time: 08/27/2020 10:53

Field ID: G3CE0006

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2193085	EPA 180.1 Rev. 2.0	Turbidity	2.2		NTU	P386705	
	EPA 300.0 Rev. 2.1	Chloride	240		mg Cl/L	P387062	
		Sulfate	28		mg SO4/L	P387067	
	SM 2120 B-2011	Color (true)	300		PCU	P386711	
	SM 2320 B-2011	Total Alkalinity	70		mg CaCO3/L	P386763	
	SM 2540 C-2011	TDS	604		mg/L	P387160	
	SM 2540 D-2011	TSS	4	I	mg/L	P387002	
	SM 4500 F-C-2011	Fluoride	0.11		mg F/L	P386902	
2193086	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P387024	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P386868	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P386782	
	EPA 365.1 Rev. 2.0	Total-P	0.081		mg P/L	P386853	MS
	SM 5310 B-2011	Organic Carbon	31		mg C/L	P386768	
2193087	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.039		mg P/L	P386706	
2193112	EPA 200.7 Rev. 4.4	Barium	27.5		ug/L	P386852	
		Calcium	42.7		mg/L	P386852	
		Iron	800		ug/L	P386852	
		Magnesium	16.4		mg/L	P386852	
		Potassium	4.6		mg/L	P386852	
		Sodium	136		mg/L	P386852	
		Zinc	5.0	U	ug/L	P386852	
	EPA 200.8 Rev. 5.4	Aluminum	36		ug/L	P386852	
		Antimony	0.069	I	ug/L	P386852	
		Arsenic	0.87		ug/L	P386852	
		Beryllium	0.012	I	ug/L	P386852	
		Boron**	58.5		ug/L	P386852	
		Cadmium	0.020	U	ug/L	P386852	
		Chromium	0.40	U	ug/L	P386852	
		Copper	0.40	U	ug/L	P387326	
		Lead	0.20	U	ug/L	P386852	
		Nickel	0.50	U	ug/L	P386852	
		Selenium	0.20	U	ug/L	P386852	
		Silver	0.010	U	ug/L	P386852	
		Thallium	0.10	U	ug/L	P386852	
	SM 2340B	Hardness	174		mg/L	P386852	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Florence Lake @ Center

Collection Date/Time: 08/27/2020 13:23

Field ID: G3CE0012

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2193088	EPA 180.1 Rev. 2.0	Turbidity	3.1		NTU	P386705	
	EPA 300.0 Rev. 2.1	Chloride	160		mg Cl/L	P387062	
		Sulfate	32		mg SO4/L	P387067	
		Color (true)	830		PCU	P386711	
	SM 2320 B-2011	Total Alkalinity	74		mg CaCO3/L	P386763	
	SM 2540 C-2011	TDS	556	A	mg/L	P387161	
	SM 2540 D-2011	TSS	5	IA	mg/L	P387003	
	SM 4500 F-C-2011	Fluoride	0.11		mg F/L	P386902	
2193090	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P387024	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	3.1		mg N/L	P386868	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.008	I	mg N/L	P386782	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P386853	MS
	SM 5310 B-2011	Organic Carbon	58		mg C/L	P386768	
2193092	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.076		mg P/L	P386707	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Ruth Lake @ Center

Collection Date/Time: 08/27/2020 10:38

Field ID: G3CE0021

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2193089	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P386705	
	EPA 300.0 Rev. 2.1	Chloride	250		mg Cl/L	P387062	
		Sulfate	30		mg SO4/L	P387067	
	SM 2120 B-2011	Color (true)	300		PCU	P386711	
	SM 2320 B-2011	Total Alkalinity	68		mg CaCO3/L	P386763	
	SM 2540 C-2011	TDS	612		mg/L	P387161	
	SM 2540 D-2011	TSS	3	I	mg/L	P387003	
	SM 4500 F-C-2011	Fluoride	0.11		mg F/L	P386902	
2193091	EPA 350.1 Rev. 2.0	Ammonia-N	0.026		mg N/L	P387032	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P386868	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P386782	
	EPA 365.1 Rev. 2.0	Total-P	0.066		mg P/L	P386853	MS
	SM 5310 B-2011	Organic Carbon	30		mg C/L	P386768	
2193093	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.032		mg P/L	P386707	

Ref. Method and Comment:

SM 2540 D-2011: 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: P386705

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P386852

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: P386852

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	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 200.8 Rev. 5.4
Batch ID: P387326

Component	Result	Code	Units
Copper	0.40	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387062

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387067

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387024

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387032

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386868

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P386782

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: P386853

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386706

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386707

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

Reference Method: SM 2120 B-2011
Batch ID: P386711

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P386763

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P387160

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-2011
Batch ID: P387161

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P387002

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P387003

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P386902

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P386768

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: P386852

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	107		P	85 - 115
Calcium	109		P	85 - 115
Iron	110		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	105		P	85 - 115
Sodium	105		P	85 - 115
Zinc	108		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P386852

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	94.0		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	97.9		P	85 - 115
Beryllium	109		P	80 - 120
Boron	98.9		P	85 - 115
Cadmium	97.9		P	85 - 115
Chromium	102		P	85 - 115
Lead	99.2		P	85 - 115
Nickel	94.8		P	85 - 115
Selenium	96.9		P	85 - 115
Silver	106		P	85 - 115
Thallium	99.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P387326

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387062

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387067

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387024

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387032

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386868

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.7		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P386782

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: P386853

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386706

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.3		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386707

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

Reference Method: SM 2120 B-2011
Batch ID: P386711

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.1		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P386763

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P386902

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	102		P	90 - 106

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P386768

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P386852

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193388	Barium	109	105	P/P	80 - 120
2193388	Calcium	107		P	80 - 120
2193388	Iron	110	108	P/P	80 - 120
2193388	Magnesium	107		P	80 - 120
2193388	Potassium	103	100	P/P	80 - 120
2193388	Sodium	103		P	80 - 120
2193388	Zinc	112	109	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P386852

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193388	Aluminum	83.0	92.7	P/P	80 - 120
2193388	Antimony	100	102	P/P	80 - 120
2193388	Arsenic	99.0	101	P/P	80 - 120
2193388	Beryllium	107	110	P/P	80 - 120
2193388	Boron	97.0	99.4	P/P	80 - 120
2193388	Cadmium	100	102	P/P	80 - 120
2193388	Chromium	103	105	P/P	80 - 120
2193388	Lead	98.0	101	P/P	80 - 120
2193388	Nickel	92.9	94.6	P/P	80 - 120
2193388	Selenium	97.1	98.2	P/P	80 - 120
2193388	Silver	104	106	P/P	80 - 120
2193388	Thallium	104	107	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P387326

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193356	Copper	102	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387062

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193266	Chloride	102		P	90 - 110
2193466	Chloride	99.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387067

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193266	Sulfate	100		P	90 - 110
2193466	Sulfate	97.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387024

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193045	Ammonia-N	106	109	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387032

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193268	Ammonia-N	100	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386868

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193045	Kjeldahl Nitrogen	106	109	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P386782

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193086	NO2NO3-N	98.0	96.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P386853

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193044	Total-P	112	111	F/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386706

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2192954	O-Phosphate-P	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386707

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193093	O-Phosphate-P	98.7	99.2	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P386902

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2192997	Fluoride	102	102	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P386768

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2192839	Organic Carbon	99.0	101	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P386705

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193035	Turbidity	0.984	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P386852

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193388	Barium	3.73	Spike	P	0 - 20
2193388	Calcium	2.38	Spike	P	0 - 20
2193388	Iron	2.15	Spike	P	0 - 20
2193388	Magnesium	1.93	Spike	P	0 - 20
2193388	Potassium	1.89	Spike	P	0 - 20
2193388	Sodium	2.42	Spike	P	0 - 20
2193388	Zinc	2.66	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P386852

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193388	Aluminum	5.01	Spike	P	0 - 20
2193388	Antimony	1.70	Spike	P	0 - 20
2193388	Arsenic	1.75	Spike	P	0 - 20
2193388	Beryllium	2.68	Spike	P	0 - 20
2193388	Boron	1.87	Spike	P	0 - 20
2193388	Cadmium	1.65	Spike	P	0 - 20
2193388	Chromium	1.85	Spike	P	0 - 20
2193388	Lead	2.64	Spike	P	0 - 20
2193388	Nickel	1.70	Spike	P	0 - 20
2193388	Selenium	1.14	Spike	P	0 - 20
2193388	Silver	1.44	Spike	P	0 - 20
2193388	Thallium	3.23	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P387326

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193356	Copper	0.768	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387062

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193266	Chloride	1.74	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387067

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193266	Sulfate	1.16	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387024

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193045	Ammonia-N	2.11	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387032

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193268	Ammonia-N	1.10	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P386868

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193045	Kjeldahl Nitrogen	1.86	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P386782

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193086	NO2NO3-N	1.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P386853

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193044	Total-P	0.759	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386706

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192954	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386707

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193093	O-Phosphate-P	0.383	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B-2011
 Batch ID: P386711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193005	Color (true)	2.17	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
 Batch ID: P386763

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192997	Total Alkalinity	0.323	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
 Batch ID: P387160

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192975	TDS	3.94	Sample	P	0 - 10

Reference Method: SM 2540 C-2011
 Batch ID: P387161

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193088	TDS	2.16	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
 Batch ID: P386902

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192997	Fluoride	0.0	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
 Batch ID: P386768

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2192839	Organic Carbon	1.61	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A100711

Included Lab Sample IDs: 2193085, 2193088, 2193089

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A100712

Included Lab Sample IDs: 2193087, 2193092, 2193093

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	99.7	P/P	90 - 110
O-Phosphate-P	99.7	101	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A100713

Included Lab Sample IDs: 2193085, 2193088, 2193089

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.0	99.2	P/P	90 - 115
Color (true)	99.2	100	P/P	90 - 115

Reference Method: SM 2320 B-2011

Run ID: A100734

Included Lab Sample IDs: 2193085, 2193088, 2193089

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	98.8	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A100736

Included Lab Sample IDs: 2193086, 2193090, 2193091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.2	97.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A100742

Included Lab Sample IDs: 2193086, 2193090, 2193091

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

Reference Method: SM 4500 F-C-2011

Run ID: A100801

Included Lab Sample IDs: 2193085, 2193088, 2193089

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A100807

Included Lab Sample IDs: 2193086, 2193090, 2193091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A100807

Included Lab Sample IDs: 2193086, 2193090, 2193091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	101	P/P	90 - 110
Kjeldahl Nitrogen	98.6	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A100834

Included Lab Sample IDs: 2193086, 2193090, 2193091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	103	P/P	90 - 110
Ammonia-N	104	102	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A100837

Included Lab Sample IDs: 2193112

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	105	P/P	95 - 105
Calcium	102	103	P/P	95 - 105
Iron	103	104	P/P	95 - 105
Magnesium	102	103	P/P	95 - 105
Potassium	99.8	101	P/P	95 - 105
Sodium	100	101	P/P	95 - 105
Zinc	101	106	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A100843

Included Lab Sample IDs: 2193085, 2193088, 2193089

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A100913

Included Lab Sample IDs: 2193112

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	95.9	95.2	P/P	90 - 110
Antimony	103	103	P/P	90 - 110
Arsenic	97.3	96.8	P/P	90 - 110
Boron	97.1	97.7	P/P	90 - 110
Cadmium	96.1	95.6	P/P	90 - 110
Chromium	99.4	99.3	P/P	90 - 110
Lead	96.1	96.4	P/P	90 - 110
Nickel	94.3	93.9	P/P	90 - 110
Selenium	98.5	98.4	P/P	90 - 110
Thallium	95.5	95.7	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A100945

Included Lab Sample IDs: 2193112

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A100950

Included Lab Sample IDs: 2193112

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A100993

Included Lab Sample IDs: 2193112

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	96.8	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A101048

Included Lab Sample IDs: 2193086, 2193090, 2193091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	104	P/P	85 - 115

* 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		LCS	Precision	MS
						SMP	
EPA 180.1 Rev. 2.0	Turbidity					0.984	
EPA 200.7 Rev. 4.4	Barium	107	109	105			3.73
	Calcium	109	107				2.38
	Iron	110	110	108			2.15
	Magnesium	108	107				1.93
	Potassium	105	103	100			1.89
	Sodium	105	103				2.42
	Zinc	108	112	109			2.66
EPA 200.8 Rev. 5.4	Aluminum	94.0	83.0	92.7			5.01
	Antimony	101	100	102			1.70
	Arsenic	97.9	99.0	101			1.75
	Beryllium	109	107	110			2.68
	Boron	98.9	97.0	99.4			1.87
	Cadmium	97.9	100	102			1.65
	Chromium	102	103	105			1.85
	Copper	102	102	101			0.768
	Lead	99.2	98.0	101			2.64
	Nickel	94.8	92.9	94.6			1.70
	Selenium	96.9	97.1	98.2			1.14
	Silver	106	104	106			1.44
	Thallium	99.9	104	107			3.23
EPA 300.0 Rev. 2.1	Chloride	101	102	99.7		1.74	
	Sulfate	99.0	100	97.9		1.16	
EPA 350.1 Rev. 2.0	Ammonia-N	102	106	109			2.11
	Ammonia-N	103	100	99.0			1.10
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.7	106	109			1.86
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	98.0	96.5			1.54
EPA 365.1 Rev. 2.0	Total-P	110	112	111			0.759
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.3	100	100			0.0
	O-Phosphate-P	102	98.7	99.2			0.383
SM 2120 B-2011	Color (true)	97.1				2.17	
SM 2320 B-2011	Total Alkalinity	100				0.323	
SM 2540 C-2011	TDS					3.94	
	TDS					2.16	
SM 4500 F-C-2011	Fluoride	102	102	102			0.0
SM 5310 B-2011	Organic Carbon	99.6	99.0	101			1.61

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2193085, 2193088, 2193089
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2193112
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2193112
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2193085, 2193088, 2193089
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2193085, 2193088, 2193089
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2193086, 2193090, 2193091
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2193086, 2193090, 2193091
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2193086, 2193090, 2193091
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2193086, 2193090, 2193091
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2193087, 2193092, 2193093

Reference Method Descriptions

Method	Description	Associated Samples
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2193085, 2193088, 2193089
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2193085, 2193088, 2193089
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2193112
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2193085, 2193088, 2193089
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2193085, 2193088, 2193089
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2193085, 2193088, 2193089
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2193086, 2193090, 2193091

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	08/28/2020			08/28/2020 14:51	Yen Ta	2193085, 2193088, 2193089
EPA 200.7 Rev. 4.4	08/28/2020	09/02/2020 13:20	Elliott D. Healy	09/04/2020 16:17	Betina Topolski	2193112
EPA 200.8 Rev. 5.4	08/28/2020	09/02/2020 13:20	Elliott D. Healy	09/10/2020 23:00	Alexander Thompson	2193112
	08/28/2020	09/02/2020 13:20	Elliott D. Healy	09/11/2020 17:47	Alexander Thompson	2193112
	08/28/2020	09/02/2020 13:20	Elliott D. Healy	09/13/2020 19:12	Alexander Thompson	2193112
	08/28/2020	09/14/2020 15:10	Elliott D. Healy	09/15/2020 17:54	Alexander Thompson	2193112
EPA 300.0 Rev. 2.1	08/28/2020			09/05/2020 12:07	Julia Storbeck	2193085
	08/28/2020			09/05/2020 12:19	Julia Storbeck	2193088
	08/28/2020			09/05/2020 12:31	Julia Storbeck	2193089
EPA 350.1 Rev. 2.0	08/28/2020			09/06/2020 13:35	Ping Hua	2193086
	08/28/2020			09/06/2020 13:36	Ping Hua	2193090
	08/28/2020			09/06/2020 14:12	Ping Hua	2193091
EPA 351.2 Rev. 2.0	08/28/2020	09/02/2020 12:20	David Boose	09/03/2020 14:10	Virginia P. Brown	2193086
	08/28/2020	09/02/2020 12:20	David Boose	09/03/2020 14:15	Virginia P. Brown	2193090
	08/28/2020	09/02/2020 12:20	David Boose	09/03/2020 14:17	Virginia P. Brown	2193091
EPA 353.2 Rev. 2.0	08/28/2020			09/01/2020 11:49	Beverly Y. Sanders	2193086
	08/28/2020			09/01/2020 11:55	Beverly Y. Sanders	2193090
	08/28/2020			09/01/2020 11:56	Beverly Y. Sanders	2193091
EPA 365.1 Rev. 2.0	08/28/2020	09/02/2020 13:46	Yen Ta	09/16/2020 13:08	Lipi Saha	2193086
	08/28/2020	09/02/2020 13:46	Yen Ta	09/16/2020 13:09	Lipi Saha	2193090
	08/28/2020	09/02/2020 13:46	Yen Ta	09/16/2020 13:10	Lipi Saha	2193091
EPA 365.1 Rev. 2.0 dissolved	08/28/2020			08/28/2020 15:32	Samantha Davila	2193087
	08/28/2020			08/28/2020 15:34	Samantha Davila	2193093
	08/28/2020			08/28/2020 15:41	Samantha Davila	2193092
SM 2120 B-2011	08/28/2020			08/28/2020 16:03	Benjamin T. Nordmann	2193085
	08/28/2020			08/28/2020 16:05	Benjamin T. Nordmann	2193088
	08/28/2020			08/28/2020 16:06	Benjamin T. Nordmann	2193089
SM 2320 B-2011	08/28/2020			08/31/2020 19:56	Dale L. Simmons	2193088
	08/28/2020			08/31/2020 20:09	Dale L. Simmons	2193085
	08/28/2020			08/31/2020 20:21	Dale L. Simmons	2193089
SM 2340B	08/28/2020			09/04/2020 16:17	Betina Topolski	2193112
SM 2540 C-2011	08/28/2020			08/31/2020 14:51	Yijie Li	2193085, 2193088, 2193089
SM 2540 D-2011	08/28/2020			08/31/2020 14:39	Yijie Li	2193085, 2193088, 2193089
SM 4500 F-C-2011	08/28/2020			09/03/2020 04:47	Dale L. Simmons	2193088
	08/28/2020			09/03/2020 04:52	Dale L. Simmons	2193085
	08/28/2020			09/03/2020 04:57	Dale L. Simmons	2193089
SM 5310 B-2011	08/28/2020			08/31/2020 19:46	David Boose	2193086
	08/28/2020			08/31/2020 19:58	David Boose	2193090
	08/28/2020			08/31/2020 20:10	David Boose	2193091