

Chemical Analysis Report

TLH-ROC-2019-08-07-01

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

Event Description: **Run 13**
Request ID: **RQ-2019-07-29-19**
Customer: **TLH-ROC**
Project ID: **SMP**

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

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: Liang Lin, Environmental Administrator

Date Certified: 03-SEP-2019 13:51

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored background.

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: Intercoastal 450m down stream Pine Log Boat Ramp **Collection Date/Time: 08/07/2019 10:55**

Field ID: G2TLHR0034

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2109450	EPA 180.1 Rev. 2.0	Turbidity	4.0		NTU	P368634	
	EPA 300.0 Rev. 2.1	Chloride	11		mg Cl/L	P369056	
		Sulfate	6.2		mg SO4/L	P369058	
		Color (true)	21		PCU	P368725	
	SM 2320 B-97	Total Alkalinity	48		mg CaCO3/L	P369141	
	SM 2540 C-97	TDS	84		mg/L	P369208	
	SM 2540 D-97	TSS	2	I	mg/L	P369316	
	SM 4500 F-C-97	Fluoride	0.064	I	mg F/L	P369145	
2109451	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P369088	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.31		mg N/L	P368854	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.36		mg N/L	P368953	
	EPA 365.1 Rev. 2.0	Total-P	0.019		mg P/L	P368784	
	SM 5310 B-00	Organic Carbon	3.1		mg C/L	P368744	
2109452	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P368630	
2109461	EPA 200.7 Rev. 4.4	Barium	19.0		ug/L	P368724	
		Calcium	16.0		mg/L	P368724	
		Iron	300		ug/L	P368724	
		Magnesium	2.72		mg/L	P368724	
		Potassium	1.7		mg/L	P368724	
		Sodium	10.3		mg/L	P368724	
		Zinc	5.0	U	ug/L	P368724	
	EPA 200.8 Rev. 5.4	Aluminum	137		ug/L	P369671	
		Antimony	0.050	U	ug/L	P369671	
		Arsenic	0.41		ug/L	P369671	
		Boron**	16.3		ug/L	P369671	
		Cadmium	0.020	U	ug/L	P369671	
		Chromium	0.40	U	ug/L	P369671	
		Copper	0.59	I	ug/L	P369671	
		Lead	0.20	U	ug/L	P369671	
		Nickel	0.50	U	ug/L	P369671	
		Selenium	0.20	U	ug/L	P369671	
		Silver	0.010	U	ug/L	P369671	
		Thallium	0.10	U	ug/L	P369671	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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

Sample Location: Saul Creek @ Mouth

Collection Date/Time: 08/07/2019 11:10

Field ID: G2TLHR0014

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2109441	EPA 180.1 Rev. 2.0	Turbidity	4.1	A	NTU	P368634	
	EPA 300.0 Rev. 2.1	Chloride	13		mg Cl/L	P369056	
		Sulfate	5.7		mg SO4/L	P369058	
	SM 2120 B	Color (true)	25		PCU	P368619	
	SM 2320 B-97	Total Alkalinity	49		mg CaCO3/L	P369141	
	SM 2540 C-97	TDS	88		mg/L	P369208	
	SM 2540 D-97	TSS	4	I	mg/L	P369316	
	SM 4500 F-C-97	Fluoride	0.063	I	mg F/L	P369145	
2109444	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P369088	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.33		mg N/L	P368854	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.29		mg N/L	P368952	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P368784	
	SM 5310 B-00	Organic Carbon	3.8		mg C/L	P368744	
2109447	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P368628	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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

Sample Location: Double Bayou 800m upstream from Lake Wimico

Collection Date/Time: 08/07/2019 11:30

Field ID: G2TLHR0003

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2109442	EPA 180.1 Rev. 2.0	Turbidity	2.8		NTU	P368634	
	EPA 300.0 Rev. 2.1	Chloride	81		mg Cl/L	P369056	
		Sulfate	5.2		mg SO4/L	P369058	
	SM 2120 B	Color (true)	130		PCU	P368619	
	SM 2320 B-97	Total Alkalinity	32		mg CaCO3/L	P369141	
	SM 2540 C-97	TDS	193		mg/L	P369208	
	SM 2540 D-97	TSS	3	I	mg/L	P369316	
	SM 4500 F-C-97	Fluoride	0.047	I	mg F/L	P369145	
2109445	EPA 350.1 Rev. 2.0	Ammonia-N	0.033		mg N/L	P369088	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P368854	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.026		mg N/L	P368952	
	EPA 365.1 Rev. 2.0	Total-P	0.027		mg P/L	P368784	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P368744	
2109448	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P368630	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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

Sample Location: Horseshoe Creek 100m upstream from Intercoastal / Lake Wimico

Collection Date/Time: 08/07/2019 11:55

Field ID: G2TLHR0033

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2109443	EPA 180.1 Rev. 2.0	Turbidity	3.7		NTU	P368634	
	EPA 300.0 Rev. 2.1	Chloride	130		mg Cl/L	P369056	
		Sulfate	18		mg SO4/L	P369058	
		Color (true)	130		PCU	P368725	
	SM 2320 B-97	Total Alkalinity	32		mg CaCO3/L	P369141	
	SM 2540 C-97	TDS	300	A	mg/L	P369208	
	SM 2540 D-97	TSS	3	IA	mg/L	P369316	
	SM 4500 F-C-97	Fluoride	0.057	I	mg F/L	P369145	
2109446	EPA 350.1 Rev. 2.0	Ammonia-N	0.031		mg N/L	P369088	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.56		mg N/L	P368854	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.018		mg N/L	P368953	
	EPA 365.1 Rev. 2.0	Total-P	0.024		mg P/L	P368784	
	SM 5310 B-00	Organic Carbon	12		mg C/L	P368744	
2109449	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P368628	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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: P368634

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P368724

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: P369671

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: P369056

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369058

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369088

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: P368854

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P368952

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P368953

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P368784

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368628

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368630

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

Reference Method: SM 2120 B
Batch ID: P368619

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P368725

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P369141

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: P369208

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P369316

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P369145

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P368744

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: P368724

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	100		P	85 - 115
Calcium	100		P	85 - 115
Iron	100		P	85 - 115
Magnesium	99.9		P	85 - 115
Potassium	106		P	85 - 115
Sodium	102		P	85 - 115
Zinc	98.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P369671

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.6		P	85 - 115
Antimony	99.0		P	85 - 115
Arsenic	104		P	85 - 115
Boron	98.4		P	85 - 115
Cadmium	99.4		P	85 - 115
Chromium	101		P	85 - 115
Copper	100		P	85 - 115
Lead	101		P	85 - 115
Nickel	98.6		P	85 - 115
Selenium	101		P	85 - 115
Silver	105		P	85 - 115
Thallium	104		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369056

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	96.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369058

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369088

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: P368854

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	107		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P368952

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P368953

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P368784

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	96.6		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368628

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368630

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.8		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P368619

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	105		P	85 - 115

Reference Method: SM 2120 B
Batch ID: P368725

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P369141

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P369145

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.0		P	92 - 103

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P368744

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P368724

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2108886	Barium	99.3		P	80 - 120
2108886	Calcium	95.1		P	80 - 120
2108886	Iron	101		P	80 - 120
2108886	Magnesium	101		P	80 - 120
2108886	Potassium	108		P	80 - 120
2108886	Sodium	115		P	80 - 120
2108886	Zinc	98.1		P	80 - 120
2109519	Barium	99.9	99.9	P/P	80 - 120
2109519	Calcium	98.7		P	80 - 120
2109519	Iron	99.8	102	P/P	80 - 120
2109519	Magnesium	97.0		P	80 - 120
2109519	Potassium	105	107	P/P	80 - 120
2109519	Sodium	111	110	P/P	80 - 120
2109519	Zinc	97.9	97.3	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P369671

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2108885	Aluminum	98.0	100	P/P	80 - 120
2108885	Antimony	99.8	100	P/P	80 - 120
2108885	Arsenic	99.9	101	P/P	80 - 120
2108885	Boron	94.5	99.8	P/P	80 - 120
2108885	Cadmium	99.8	103	P/P	80 - 120
2108885	Chromium	102	103	P/P	80 - 120
2108885	Copper	98.3	99.9	P/P	80 - 120
2108885	Lead	99.9	101	P/P	80 - 120
2108885	Nickel	89.4	93.8	P/P	80 - 120
2108885	Selenium	97.7	98.4	P/P	80 - 120
2108885	Silver	104	105	P/P	80 - 120
2108885	Thallium	103	105	P/P	80 - 120
2109520	Aluminum	97.5		P	80 - 120
2109520	Antimony	102		P	80 - 120
2109520	Arsenic	101		P	80 - 120
2109520	Boron	99.1		P	80 - 120
2109520	Cadmium	101		P	80 - 120
2109520	Chromium	99.7		P	80 - 120
2109520	Copper	94.6		P	80 - 120
2109520	Lead	99.3		P	80 - 120
2109520	Nickel	93.2		P	80 - 120
2109520	Selenium	98.2		P	80 - 120
2109520	Silver	105		P	80 - 120
2109520	Thallium	102		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369056

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109138	Chloride	97.7		P	90 - 110
2109413	Chloride	96.9		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369058

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109413	Sulfate	102		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369088

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109444	Ammonia-N	101	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P368854

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109415	Kjeldahl Nitrogen	106	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P368952

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109445	NO2NO3-N	98.8	97.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P368953

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109446	NO2NO3-N	98.0	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P368784

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109415	Total-P	97.2	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368628

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109309	O-Phosphate-P	96.0	96.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368630

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109448	O-Phosphate-P	94.7	95.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P369145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109510	Fluoride	98.3	97.8	P/P	89 - 106

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P368744

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2109415	Organic Carbon	100	101	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P368634

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109441	Turbidity	3.40	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P368724

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109519	Barium	0.0479	Spike	P	0 - 20
2109519	Calcium	0.0511	Spike	P	0 - 20
2109519	Iron	2.04	Spike	P	0 - 20
2109519	Magnesium	1.48	Spike	P	0 - 20
2109519	Potassium	1.71	Spike	P	0 - 20
2109519	Sodium	0.276	Spike	P	0 - 20
2109519	Zinc	0.597	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P369671

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2108885	Aluminum	1.78	Spike	P	0 - 20
2108885	Antimony	0.454	Spike	P	0 - 20
2108885	Arsenic	1.44	Spike	P	0 - 20
2108885	Boron	5.05	Spike	P	0 - 20
2108885	Cadmium	3.00	Spike	P	0 - 20
2108885	Chromium	0.782	Spike	P	0 - 20
2108885	Copper	1.68	Spike	P	0 - 20
2108885	Lead	0.913	Spike	P	0 - 20
2108885	Nickel	4.47	Spike	P	0 - 20
2108885	Selenium	0.654	Spike	P	0 - 20
2108885	Silver	1.18	Spike	P	0 - 20
2108885	Thallium	2.46	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369056

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109138	Chloride	0.233	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369058

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109138	Sulfate	0.253	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369088

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109444	Ammonia-N	1.73	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P368854

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109415	Kjeldahl Nitrogen	1.66	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P368952

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109445	NO2NO3-N	0.901	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P368953

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109446	NO2NO3-N	0.466	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P368784

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109415	Total-P	0.235	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368628

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109309	O-Phosphate-P	0.491	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368630

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109448	O-Phosphate-P	0.501	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P368619

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109412	Color (true)	0.633	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
 Batch ID: P368725

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109564	Color (true)	2.21	Sample	P	0 - 20

Reference Method: SM 2320 B-97
 Batch ID: P369141

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109510	Total Alkalinity	0.757	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
 Batch ID: P369208

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109443	TDS	0.334	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P369145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109510	Fluoride	0.479	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
 Batch ID: P368744

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2109415	Organic Carbon	0.542	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: A93337

Included Lab Sample IDs: 2109441, 2109442

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	105	104	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A93339

Included Lab Sample IDs: 2109447, 2109448, 2109449, 2109452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.6	97.8	P/P	90 - 110
O-Phosphate-P	98.8	97.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A93340

Included Lab Sample IDs: 2109441, 2109442, 2109443, 2109450

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	102	P/P	95 - 105

Reference Method: SM 2120 B

Run ID: A93368

Included Lab Sample IDs: 2109443, 2109450

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	102	P/P	90 - 115

Reference Method: SM 5310 B-00

Run ID: A93373

Included Lab Sample IDs: 2109444, 2109445, 2109446, 2109451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	103	102	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A93438

Included Lab Sample IDs: 2109461

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	102	P/P	90 - 110
Calcium	97.4	98.2	P/P	90 - 110
Iron	98.3	99.0	P/P	90 - 110
Magnesium	97.4	98.5	P/P	90 - 110
Potassium	99.7	99.1	P/P	90 - 110
Sodium	107	104	P/P	90 - 110
Zinc	98.9	99.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A93453

Included Lab Sample IDs: 2109444, 2109445, 2109446, 2109451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	104	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A93462

Included Lab Sample IDs: 2109444, 2109445, 2109446, 2109451

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A93469

Included Lab Sample IDs: 2109444, 2109445, 2109446, 2109451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	99.0	P/P	90 - 110
Total-P	99.0	98.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A93486

Included Lab Sample IDs: 2109441, 2109442, 2109443, 2109450

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	102	P/P	90 - 110
Sulfate	107	108	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A93532

Included Lab Sample IDs: 2109444, 2109445, 2109446, 2109451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	99.4	P/P	90 - 110
Ammonia-N	99.8	102	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A93545

Included Lab Sample IDs: 2109441, 2109442, 2109443, 2109450

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

Reference Method: SM 4500 F-C-97

Run ID: A93545

Included Lab Sample IDs: 2109441, 2109442, 2109443, 2109450

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A93823

Included Lab Sample IDs: 2109461

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.7	96.8	P/P	90 - 110
Antimony	97.0	96.3	P/P	90 - 110
Arsenic	98.1	98.1	P/P	90 - 110
Cadmium	98.4	97.6	P/P	90 - 110
Chromium	100	99.6	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A93823

Included Lab Sample IDs: 2109461

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	97.1	97.6	P/P	90 - 110
Lead	99.6	99.8	P/P	90 - 110
Selenium	97.0	96.5	P/P	90 - 110
Silver	106	105	P/P	90 - 110
Thallium	96.9	97.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A93935

Included Lab Sample IDs: 2109461

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	97.9	97.3	P/P	90 - 110
Nickel	95.1	94.6	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			LCS	Precision	MS
							SMP	
EPA 180.1 Rev. 2.0	Turbidity						3.40	
EPA 200.7 Rev. 4.4	Barium	100	99.3	99.9	99.9			0.0479
	Calcium	100	95.1	98.7				0.0511
	Iron	100	101	99.8	102			2.04
	Magnesium	99.9	101	97.0				1.48
	Potassium	106	108	105	107			1.71
	Sodium	102	115	111	110			0.276
	Zinc	98.5	98.1	97.9	97.3			0.597
EPA 200.8 Rev. 5.4	Aluminum	99.6	100	98.0	97.5			1.78
	Antimony	99.0	99.8	100	102			0.454
	Arsenic	104	99.9	101	101			1.44
	Boron	98.4	94.5	99.8	99.1			5.05
	Cadmium	99.4	99.8	103	101			3.00
	Chromium	101	102	103	99.7			0.782
	Copper	100	98.3	99.9	94.6			1.68
	Lead	101	99.9	101	99.3			0.913
	Nickel	98.6	89.4	93.8	93.2			4.47
	Selenium	101	97.7	98.4	98.2			0.654
	Silver	105	104	105	105			1.18
	Thallium	104	103	105	102			2.46
EPA 300.0 Rev. 2.1	Chloride	96.0	97.7	96.9			0.233	
	Sulfate	101	102				0.253	
EPA 350.1 Rev. 2.0	Ammonia-N	100	101	103				1.73
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	106	104				1.66
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	98.8	97.8				0.901
	NO ₂ NO ₃ -N	99.5	98.0	98.5				0.466
EPA 365.1 Rev. 2.0	Total-P	96.6	97.2	97.0				0.235
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.0	96.0	96.5				0.491
	O-Phosphate-P	96.8	94.7	95.2				0.501
SM 2120 B	Color (true)	105					0.633	
	Color (true)	102					2.21	
SM 2320 B-97	Total Alkalinity	104					0.757	
SM 2540 C-97	TDS						0.334	
SM 4500 F-C-97	Fluoride	97.0	98.3	97.8				0.479
SM 5310 B-00	Organic Carbon	98.8	100	101				0.542

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2109441, 2109442, 2109443, 2109450
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2109461
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2109461
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2109441, 2109442, 2109443, 2109450
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2109441, 2109442, 2109443, 2109450
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2109444, 2109445, 2109446, 2109451
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2109444, 2109445, 2109446, 2109451
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2109444, 2109445, 2109446, 2109451

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2109444, 2109445, 2109446, 2109451
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2109447, 2109448, 2109449, 2109452
SM 2120 B / E31780	True Color measured at 450 nm	2109441, 2109442, 2109443, 2109450
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2109441, 2109442, 2109443, 2109450
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2109441, 2109442, 2109443, 2109450
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2109441, 2109442, 2109443, 2109450
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2109441, 2109442, 2109443, 2109450
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2109444, 2109445, 2109446, 2109451

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	08/07/2019			08/07/2019 17:10	Rosalyn Ballman	2109441, 2109442, 2109443, 2109450
EPA 200.7 Rev. 4.4	08/07/2019	08/08/2019 17:10	Elliott D. Healy	08/12/2019 19:18	Betina Topolski	2109461
EPA 200.8 Rev. 5.4	08/07/2019	08/26/2019 15:30	Elliott D. Healy	08/27/2019 22:38	Justin Cutchin	2109461
	08/07/2019	08/26/2019 15:30	Elliott D. Healy	08/30/2019 15:24	Robert K Palmer	2109461
EPA 300.0 Rev. 2.1	08/07/2019			08/15/2019 03:20	Jhamieka S. Greenwood	2109441
	08/07/2019			08/15/2019 03:32	Jhamieka S. Greenwood	2109442
	08/07/2019			08/15/2019 03:44	Jhamieka S. Greenwood	2109443
	08/07/2019			08/15/2019 03:56	Jhamieka S. Greenwood	2109450
EPA 350.1 Rev. 2.0	08/07/2019			08/14/2019 13:47	Ping Hua	2109444
	08/07/2019			08/14/2019 14:02	Ping Hua	2109445
	08/07/2019			08/14/2019 14:04	Ping Hua	2109446
	08/07/2019			08/14/2019 14:05	Ping Hua	2109451
EPA 351.2 Rev. 2.0	08/07/2019	08/12/2019 13:30	Sima Feizi	08/13/2019 10:11	Joseph Suarez	2109444
	08/07/2019	08/12/2019 13:30	Sima Feizi	08/13/2019 10:13	Joseph Suarez	2109445
	08/07/2019	08/12/2019 13:30	Sima Feizi	08/13/2019 10:14	Joseph Suarez	2109446
	08/07/2019	08/12/2019 13:30	Sima Feizi	08/13/2019 10:16	Joseph Suarez	2109451
EPA 353.2 Rev. 2.0	08/07/2019			08/13/2019 11:51	Beverly Y. Sanders	2109444
	08/07/2019			08/13/2019 11:52	Beverly Y. Sanders	2109445
	08/07/2019			08/13/2019 11:59	Beverly Y. Sanders	2109446
	08/07/2019			08/13/2019 12:05	Beverly Y. Sanders	2109451
EPA 365.1 Rev. 2.0	08/07/2019	08/09/2019 13:46	Vijayalakshmi Reddy	08/13/2019 14:20	Lipi Saha	2109444
	08/07/2019	08/09/2019 13:46	Vijayalakshmi Reddy	08/13/2019 14:28	Lipi Saha	2109445
	08/07/2019	08/09/2019 13:46	Vijayalakshmi Reddy	08/13/2019 14:29	Lipi Saha	2109446
	08/07/2019	08/09/2019 13:46	Vijayalakshmi Reddy	08/13/2019 14:30	Lipi Saha	2109451
EPA 365.1 Rev. 2.0 dissolved	08/07/2019			08/07/2019 17:03	Jhamieka S. Greenwood	2109448
	08/07/2019			08/07/2019 17:08	Jhamieka S. Greenwood	2109449
	08/07/2019			08/07/2019 17:14	Jhamieka S. Greenwood	2109452
	08/07/2019			08/07/2019 17:15	Jhamieka S. Greenwood	2109447
SM 2120 B	08/07/2019			08/07/2019 17:46	Madeline Funaro	2109441, 2109442
	08/07/2019			08/08/2019 16:23	Madeline Funaro	2109443, 2109450
SM 2320 B-97	08/07/2019			08/15/2019 06:09	Dale L. Simmons	2109441
	08/07/2019			08/15/2019 06:21	Dale L. Simmons	2109442
	08/07/2019			08/15/2019 06:33	Dale L. Simmons	2109443
	08/07/2019			08/15/2019 06:46	Dale L. Simmons	2109450
SM 2540 C-97	08/07/2019			08/12/2019 16:08	Yijie Li	2109441, 2109442, 2109443, 2109450
SM 2540 D-97	08/07/2019			08/12/2019 16:08	Yijie Li	2109441, 2109442, 2109443, 2109450
SM 4500 F-C-97	08/07/2019			08/15/2019 06:09	Dale L. Simmons	2109441
	08/07/2019			08/15/2019 06:21	Dale L. Simmons	2109442
	08/07/2019			08/15/2019 06:33	Dale L. Simmons	2109443
	08/07/2019			08/15/2019 06:46	Dale L. Simmons	2109450

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 5310 B-00	08/07/2019			08/08/2019 23:05	Madeline Funaro	2109444
	08/07/2019			08/08/2019 23:17	Madeline Funaro	2109445
	08/07/2019			08/08/2019 23:29	Madeline Funaro	2109446
	08/07/2019			08/08/2019 23:41	Madeline Funaro	2109451