

Chemical Analysis Report

TLH-ROC-2021-01-27-02

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

Event Description: **Run 14**
Request ID: **RQ-2021-01-25-42**
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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 17-FEB-2021 18:32



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: Williford Spring

Collection Date/Time: 01/27/2021 10:30

Field ID: G3TLHR0009

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2221957	EPA 180.1 Rev. 2.0	Turbidity	0.30		NTU	P393077	
	EPA 300.0 Rev. 2.1	Chloride	2.8	A	mg Cl/L	P393372	
		Sulfate	1.5	A	mg SO4/L	P393375	
	SM 2120 B-2011	Color (true)	2.5	U	PCU	P393061	
	SM 2320 B-2011	Total Alkalinity	64		mg CaCO3/L	P393235	
	SM 2540 C-2011	TDS	69		mg/L	P393485	
	SM 2540 D-2011	TSS	2	U	mg/L	P393359	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P393238	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P393465	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P393304	MS
2221959	EPA 353.2 Rev. 2.0	NO2NO3-N	0.11		mg N/L	P393193	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P393323	
	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P393188	
	EPA 365.1 Rev. 2.0	O-Phosphate-P	0.014		mg P/L	P393113	MS
	dissolved						

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: Crystal Lake Center

Collection Date/Time: 01/27/2021 11:55

Field ID: G3TLHR0012

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2221963	EPA 180.1 Rev. 2.0	Turbidity	0.45		NTU	P393077	
	EPA 300.0 Rev. 2.1	Chloride	2.5		mg Cl/L	P393372	
		Sulfate	3.6		mg SO4/L	P393375	
		Color (true)	2.5	UA	PCU	P393063	
	SM 2320 B-2011	Total Alkalinity	4.3		mg CaCO3/L	P393235	
	SM 2540 C-2011	TDS	18	I	mg/L	P393485	
	SM 2540 D-2011	TSS	2	U	mg/L	P393359	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P393238	
2221964	EPA 350.1 Rev. 2.0	Ammonia-N	0.044		mg N/L	P393467	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.20	I	mg N/L	P393304	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.057		mg N/L	P393193	
	EPA 365.1 Rev. 2.0	Total-P	0.003	I	mg P/L	P393323	
	SM 5310 B-2011	Organic Carbon	1.3		mg C/L	P393188	
2221965	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P393115	
2221969	EPA 200.7 Rev. 4.4	Barium	4.9		ug/L	P393068	
		Calcium	2.52		mg/L	P393068	
		Iron	30	U	ug/L	P393068	
		Magnesium	0.66		mg/L	P393068	
		Manganese	3.0	I	ug/L	P393068	
		Potassium	0.37	I	mg/L	P393068	
		Sodium	1.6	I	mg/L	P393068	
		Zinc	5.0	U	ug/L	P393068	
	EPA 200.8 Rev. 5.4	Aluminum	8.2	I	ug/L	P393068	
		Antimony	0.050	U	ug/L	P393068	
		Arsenic	0.86		ug/L	P393068	
		Beryllium	0.010	U	ug/L	P393068	
		Boron**	10.8		ug/L	P393068	
		Cadmium	0.020	U	ug/L	P393068	
		Chromium	0.40	U	ug/L	P393068	
		Copper	0.40	U	ug/L	P393068	
		Lead	0.20	U	ug/L	P393068	
		Nickel	0.50	U	ug/L	P393068	
		Selenium	0.20	U	ug/L	P393068	
		Silver	0.010	U	ug/L	P393068	
		Thallium	0.10	U	ug/L	P393068	
		Hardness	9.0		mg/L	P393068	

Ref. Method and Comment:

SM 2120 B-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

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

Sample Location: Rattlesnake Lake Center

Collection Date/Time: 01/27/2021 11:00

Field ID: G3TLHR0013

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2221958	EPA 180.1 Rev. 2.0	Turbidity	1.9		NTU	P393077	
	EPA 300.0 Rev. 2.1	Chloride	1.9		mg Cl/L	P393372	
		Sulfate	1.2		mg SO4/L	P393375	
	SM 2120 B-2011	Color (true)	18		PCU	P393061	
	SM 2320 B-2011	Total Alkalinity	2.3	I	mg CaCO3/L	P393235	
	SM 2540 C-2011	TDS	15	I	mg/L	P393485	
	SM 2540 D-2011	TSS	2	I	mg/L	P393359	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P393238	
2221960	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P393465	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.26		mg N/L	P393304	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.034		mg N/L	P393193	
	EPA 365.1 Rev. 2.0	Total-P	0.007		mg P/L	P393323	
	SM 5310 B-2011	Organic Carbon	2.8		mg C/L	P393188	
2221962	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P393115	

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: P393077

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P393068

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
Manganese	1.0	U	ug/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: P393068

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
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: P393372

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393375

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393465

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393467

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393304

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393193

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393323

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393113

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393115

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

Reference Method: SM 2120 B-2011
Batch ID: P393061

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B-2011
Batch ID: P393063

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P393235

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P393485

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P393359

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P393238

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P393188

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: P393068

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.7		P	85 - 115
Calcium	108		P	85 - 115
Iron	107		P	85 - 115
Magnesium	107		P	85 - 115
Manganese	99.7		P	85 - 115
Potassium	102		P	85 - 115
Sodium	105		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P393068

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.1		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	98.4		P	85 - 115
Beryllium	94.4		P	85 - 115
Boron	101		P	85 - 115
Cadmium	85.6		P	85 - 115
Chromium	106		P	85 - 115
Copper	97.1		P	85 - 115
Lead	103		P	85 - 115
Nickel	97.4		P	85 - 115
Selenium	97.4		P	85 - 115
Silver	112		P	85 - 115
Thallium	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393372

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393375

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

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P393465

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P393467

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393304

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393193

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393323

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393113

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393115

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

Reference Method: SM 2120 B-2011
Batch ID: P393061

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P393063

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P393235

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.1		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P393238

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.3		P	90 - 106

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P393188

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.2		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P393068

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221732	Barium	101		P	80 - 120
2221732	Calcium	106		P	80 - 120
2221732	Iron	107		P	80 - 120
2221732	Magnesium	107		P	80 - 120
2221732	Manganese	101		P	80 - 120
2221732	Potassium	102		P	80 - 120
2221732	Sodium	103		P	80 - 120
2221732	Zinc	104		P	80 - 120
2221969	Barium	105	97.7	P/P	80 - 120
2221969	Calcium	113	104	P/P	80 - 120
2221969	Iron	110	104	P/P	80 - 120
2221969	Magnesium	111	104	P/P	80 - 120
2221969	Manganese	105	97.6	P/P	80 - 120
2221969	Potassium	105	99.2	P/P	80 - 120
2221969	Sodium	109	102	P/P	80 - 120
2221969	Zinc	107	97.3	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P393068

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221732	Aluminum	96.3		P	80 - 120
2221732	Antimony	99.0		P	80 - 120
2221732	Arsenic	97.7		P	80 - 120
2221732	Beryllium	91.8		P	80 - 120
2221732	Boron	98.7		P	80 - 120
2221732	Cadmium	92.7		P	80 - 120
2221732	Chromium	104		P	80 - 120
2221732	Copper	96.8		P	80 - 120
2221732	Lead	104		P	80 - 120
2221732	Nickel	95.9		P	80 - 120
2221732	Selenium	95.2		P	80 - 120
2221732	Silver	107		P	80 - 120
2221732	Thallium	101		P	80 - 120
2221969	Aluminum	97.6	97.1	P/P	80 - 120
2221969	Antimony	99.0	101	P/P	80 - 120
2221969	Arsenic	94.2	97.1	P/P	80 - 120
2221969	Beryllium	89.6	93.3	P/P	80 - 120
2221969	Boron	98.8	102	P/P	80 - 120
2221969	Cadmium	80.9	90.6	P/P	80 - 120
2221969	Chromium	106	106	P/P	80 - 120
2221969	Copper	96.7	98.0	P/P	80 - 120
2221969	Lead	103	102	P/P	80 - 120
2221969	Nickel	95.6	97.3	P/P	80 - 120
2221969	Selenium	88.7	94.8	P/P	80 - 120
2221969	Silver	107	110	P/P	80 - 120
2221969	Thallium	102	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393372

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
---------------	-----------	---------	---------	-----------	----------------

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393372

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221957	Chloride	104		P	90 - 110
2222076	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393375

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221957	Sulfate	102		P	90 - 110
2222076	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393465

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221708	Ammonia-N	95.8	98.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393467

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221964	Ammonia-N	98.9	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393304

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221213	Kjeldahl Nitrogen	109	112	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393193

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221861	NO2NO3-N	98.2	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393323

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221862	Total-P	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393113

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221590	O-Phosphate-P	79.8	79.2	F/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393115

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221965	O-Phosphate-P	102	102	P/P	90 - 110

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P393238

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221986	Fluoride	101	98.5	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P393188

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221667	Organic Carbon	96.8	96.5	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P393077

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221561	Turbidity	4.07	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P393068

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221969	Barium	6.88	Spike	P	0 - 20
2221969	Calcium	5.35	Spike	P	0 - 20
2221969	Iron	6.20	Spike	P	0 - 20
2221969	Magnesium	5.90	Spike	P	0 - 20
2221969	Manganese	7.16	Spike	P	0 - 20
2221969	Potassium	5.00	Spike	P	0 - 20
2221969	Sodium	4.88	Spike	P	0 - 20
2221969	Zinc	9.38	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P393068

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221969	Aluminum	0.507	Spike	P	0 - 20
2221969	Antimony	2.24	Spike	P	0 - 20
2221969	Arsenic	2.98	Spike	P	0 - 20
2221969	Beryllium	4.02	Spike	P	0 - 20
2221969	Boron	2.98	Spike	P	0 - 20
2221969	Cadmium	11.3	Spike	P	0 - 20
2221969	Chromium	0.285	Spike	P	0 - 20
2221969	Copper	1.29	Spike	P	0 - 20
2221969	Lead	0.719	Spike	P	0 - 20
2221969	Nickel	1.74	Spike	P	0 - 20
2221969	Selenium	6.67	Spike	P	0 - 20
2221969	Silver	2.89	Spike	P	0 - 20
2221969	Thallium	1.01	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393372

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221957	Chloride	1.26	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P393375

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221957	Sulfate	4.50	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393465

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221708	Ammonia-N	2.05	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393467

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221964	Ammonia-N	1.32	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393304

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221213	Kjeldahl Nitrogen	1.45	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393193

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221861	NO2NO3-N	0.366	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393323

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221862	Total-P	0.117	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393113

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221590	O-Phosphate-P	0.755	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393115

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221965	O-Phosphate-P	0.883	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P393061

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221860	Color (true)	0.996	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-2011
Batch ID: P393235

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221986	Total Alkalinity	0.967	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P393485

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221710	TDS	3.57	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P393238

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221986	Fluoride	2.29	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P393188

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2221667	Organic Carbon	0.182	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B-2011

Run ID: A103286

Included Lab Sample IDs: 2221957, 2221958, 2221963

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	101	P/P	85 - 115
Color (true)	103	103	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A103288

Included Lab Sample IDs: 2221957, 2221958, 2221963

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	100	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A103306

Included Lab Sample IDs: 2221961, 2221962, 2221965

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	99.4	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A103332

Included Lab Sample IDs: 2221969

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	97.6	99.6	P/P	90 - 110
Calcium	102	102	P/P	90 - 110
Iron	102	101	P/P	90 - 110
Magnesium	102	101	P/P	90 - 110
Manganese	99.7	102	P/P	90 - 110
Potassium	100	100	P/P	90 - 110
Sodium	101	101	P/P	90 - 110
Zinc	100	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A103333

Included Lab Sample IDs: 2221969

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	101	P/P	90 - 110
Antimony	99.4	101	P/P	90 - 110
Arsenic	98.5	99.3	P/P	90 - 110
Beryllium	97.0	97.7	P/P	90 - 110
Boron	104	107	P/P	90 - 110
Chromium	109	109	P/P	90 - 110
Copper	96.5	97.9	P/P	90 - 110
Lead	102	102	P/P	90 - 110
Nickel	95.8	98.3	P/P	90 - 110
Selenium	98.2	99.0	P/P	90 - 110
Silver	107	107	P/P	90 - 110
Thallium	103	104	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-2011

Run ID: A103337

Included Lab Sample IDs: 2221959, 2221960, 2221964

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A103338

Included Lab Sample IDs: 2221959, 2221960, 2221964

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A103351

Included Lab Sample IDs: 2221969

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cadmium	90.9	93.5	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A103361

Included Lab Sample IDs: 2221957, 2221958, 2221963

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.3	92.8	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A103361

Included Lab Sample IDs: 2221957, 2221958, 2221963

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	103	96.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A103409

Included Lab Sample IDs: 2221959, 2221960, 2221964

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	99.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A103412

Included Lab Sample IDs: 2221957, 2221958, 2221963

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	102	P/P	90 - 110
Sulfate	100	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A103445

Included Lab Sample IDs: 2221959, 2221960, 2221964

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.0	98.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A103445

Included Lab Sample IDs: 2221959, 2221960, 2221964

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.0	97.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A103455

Included Lab Sample IDs: 2221959, 2221960, 2221964

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.8	99.3	P/P	90 - 110
Ammonia-N	99.2	97.5	P/P	90 - 110

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

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision	
						LCS	SMP MS
EPA 180.1 Rev. 2.0	Turbidity						4.07
EPA 200.7 Rev. 4.4	Barium	99.7	101	105	97.7		6.88
	Calcium	108	106	113	104		5.35
	Iron	107	107	110	104		6.20
	Magnesium	107	107	111	104		5.90
	Manganese	99.7	101	105	97.6		7.16
	Potassium	102	102	105	99.2		5.00
	Sodium	105	103	109	102		4.88
	Zinc	102	104	107	97.3		9.38
EPA 200.8 Rev. 5.4	Aluminum	98.1	97.6	97.1	96.3		0.507
	Antimony	102	99.0	101	99.0		2.24
	Arsenic	98.4	94.2	97.1	97.7		2.98
	Beryllium	94.4	89.6	93.3	91.8		4.02
	Boron	101	98.8	102	98.7		2.98
	Cadmium	85.6	80.9	90.6	92.7		11.3
	Chromium	106	106	106	104		0.285
	Copper	97.1	96.7	98.0	96.8		1.29
	Lead	103	103	102	104		0.719
	Nickel	97.4	95.6	97.3	95.9		1.74
	Selenium	97.4	88.7	94.8	95.2		6.67
	Silver	112	107	110	107		2.89
	Thallium	101	102	101	101		1.01
EPA 300.0 Rev. 2.1	Chloride	104	104	101		1.26	
	Sulfate	102	102	101		4.50	
EPA 350.1 Rev. 2.0	Ammonia-N	97.4	95.8	98.5			2.05
	Ammonia-N	99.5	98.9	101			1.32
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	109	112			1.45
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	98.2	98.8			0.366
EPA 365.1 Rev. 2.0	Total-P	104	104	104			0.117
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	79.8	79.2			0.755
	O-Phosphate-P	102	102	102			0.883
SM 2120 B-2011	Color (true)	102				0.996	
	Color (true)	102					
SM 2320 B-2011	Total Alkalinity	98.1				0.967	
SM 2540 C-2011	TDS					3.57	
SM 4500 F-C-2011	Fluoride	95.3	101	98.5			2.29
SM 5310 B-2011	Organic Carbon	97.2	96.8	96.5			0.182

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2221957, 2221958, 2221963
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2221969
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2221969
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2221957, 2221958, 2221963
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2221957, 2221958, 2221963
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2221959, 2221960, 2221964
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2221959, 2221960, 2221964
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2221959, 2221960, 2221964
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2221959, 2221960, 2221964

Reference Method Descriptions

Method	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2221961, 2221962, 2221965
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2221957, 2221958, 2221963
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2221957, 2221958, 2221963
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2221969
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2221957, 2221958, 2221963
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2221957, 2221958, 2221963
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2221957, 2221958, 2221963
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2221959, 2221960, 2221964

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	01/27/2021			01/27/2021 16:06	Yen Ta	2221957, 2221958, 2221963
EPA 200.7 Rev. 4.4	01/27/2021	01/28/2021 14:50	Elliott D. Healy	01/29/2021 20:08	Betina Topolski	2221969
EPA 200.8 Rev. 5.4	01/27/2021	01/28/2021 14:50	Elliott D. Healy	01/29/2021 20:18	Alexander Thompson	2221969
	01/27/2021	01/28/2021 14:50	Elliott D. Healy	02/01/2021 17:58	Alexander Thompson	2221969
EPA 300.0 Rev. 2.1	01/27/2021			02/04/2021 03:20	Lipi Saha	2221957
	01/27/2021			02/04/2021 04:08	Lipi Saha	2221958
	01/27/2021			02/04/2021 04:20	Lipi Saha	2221963
EPA 350.1 Rev. 2.0	01/27/2021			02/07/2021 13:33	Ping Hua	2221959
	01/27/2021			02/07/2021 13:35	Ping Hua	2221960
	01/27/2021			02/07/2021 14:04	Ping Hua	2221964
EPA 351.2 Rev. 2.0	01/27/2021	02/03/2021 12:10	Yen Ta	02/03/2021 20:00	Julia Storbeck	2221959
	01/27/2021	02/03/2021 12:10	Yen Ta	02/03/2021 20:01	Julia Storbeck	2221960
	01/27/2021	02/03/2021 12:10	Yen Ta	02/03/2021 20:03	Julia Storbeck	2221964
EPA 353.2 Rev. 2.0	01/27/2021			02/01/2021 10:32	Beverly Y. Sanders	2221959
	01/27/2021			02/01/2021 10:33	Beverly Y. Sanders	2221960
	01/27/2021			02/01/2021 10:35	Beverly Y. Sanders	2221964
EPA 365.1 Rev. 2.0	01/27/2021	02/03/2021 16:16	Madeline Gruver	02/05/2021 14:19	Shengyu Wang	2221959
	01/27/2021	02/03/2021 16:16	Madeline Gruver	02/05/2021 14:20	Shengyu Wang	2221960
	01/27/2021	02/03/2021 16:16	Madeline Gruver	02/05/2021 14:27	Shengyu Wang	2221964
EPA 365.1 Rev. 2.0 dissolved	01/27/2021			01/27/2021 19:47	Virginia P. Brown	2221961, 2221962
	01/27/2021			01/27/2021 19:50	Virginia P. Brown	2221965
SM 2120 B-2011	01/27/2021			01/27/2021 16:22	Blanca Fach	2221957, 2221958
	01/27/2021			01/27/2021 16:43	Blanca Fach	2221963
SM 2320 B-2011	01/27/2021			02/02/2021 01:41	Dale L. Simmons	2221957
	01/27/2021			02/02/2021 01:51	Dale L. Simmons	2221958
	01/27/2021			02/02/2021 02:01	Dale L. Simmons	2221963
SM 2340B	01/27/2021			01/29/2021 20:08	Betina Topolski	2221969
SM 2540 C-2011	01/27/2021			01/29/2021 15:32	Yijie Li	2221957, 2221958, 2221963
SM 2540 D-2011	01/27/2021			01/29/2021 15:32	Yijie Li	2221957, 2221958, 2221963
SM 4500 F-C-2011	01/27/2021			02/02/2021 01:41	Dale L. Simmons	2221957
	01/27/2021			02/02/2021 01:51	Dale L. Simmons	2221958
	01/27/2021			02/02/2021 02:01	Dale L. Simmons	2221963
SM 5310 B-2011	01/27/2021			01/30/2021 10:21	Madeline Gruver	2221959
	01/27/2021			01/30/2021 10:33	Madeline Gruver	2221960
	01/27/2021			01/30/2021 10:45	Madeline Gruver	2221964