Chemical Analysis Report

NW-DIST-2021-01-29-01

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

Event Description: **Escambia River Run**
Request ID: **RQ-2021-01-25-56**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 Government Center
Suite 208
Pensacola, FL 32502-5794
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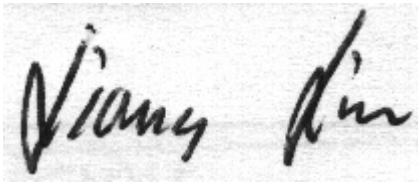
Certified by: Liang Lin, Environmental Administrator

Date Certified: 19-FEB-2021 11:26



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: Escambia River Downstream Of Cotton Lake **Collection Date/Time: 01/28/2021 13:35**

Field ID: G4NW0403 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2222260	EPA 180.1 Rev. 2.0	Turbidity	18		NTU	P393156	
	EPA 300.0 Rev. 2.1	Chloride	5.0		mg Cl/L	P393522	
		Sulfate	5.4		mg SO4/L	P393524	
	SM 2120 B-2011	Color (true)	20		PCU	P393147	
	SM 2320 B-2011	Total Alkalinity	22		mg CaCO3/L	P393236	
	SM 2540 C-2011	TDS	50		mg/L	P393488	
	SM 2540 D-2011	TSS	12		mg/L	P393537	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P393239	
2222262	EPA 350.1 Rev. 2.0	Ammonia-N	0.039		mg N/L	P393514	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.33		mg N/L	P393548	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.21		mg N/L	P393227	
	EPA 365.1 Rev. 2.0	Total-P	0.038		mg P/L	P393397	
	SM 5310 B-2011	Organic Carbon	4.5		mg C/L	P393264	
2222264	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.012		mg P/L	P393159	
2222268	EPA 200.7 Rev. 4.4	Barium	25.1		ug/L	P393199	
		Calcium	8.58		mg/L	P393199	
		Iron	1.61E+03		ug/L	P393199	
		Magnesium	1.19		mg/L	P393199	
		Manganese	35.6		ug/L	P393199	
		Potassium	0.94	I	mg/L	P393199	
		Sodium	5.0		mg/L	P393199	
		Zinc	5.1	I	ug/L	P393199	
	EPA 200.8 Rev. 5.4	Aluminum	602		ug/L	P393199	
		Antimony	0.050	U	ug/L	P393199	
		Arsenic	0.60		ug/L	P393199	
		Beryllium	0.060		ug/L	P393199	
		Boron**	9.9		ug/L	P393199	
		Cadmium	0.020	U	ug/L	P393199	
		Chromium	1.3	I	ug/L	P393199	
		Copper	1.67		ug/L	P393199	
		Lead	0.56		ug/L	P393199	
		Nickel	0.76	I	ug/L	P393199	
		Selenium	0.20	U	ug/L	P393199	
		Silver	0.010	U	ug/L	P393199	
		Thallium	0.10	U	ug/L	P393199	
	SM 2340B	Hardness	26.3		mg/L	P393199	

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: Escambia River Upstream Of Mitchell Creek **Collection Date/Time: 01/28/2021 12:30**

Field ID: G4NW0404 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2222261	EPA 180.1 Rev. 2.0	Turbidity	17		NTU	P393156	
	EPA 300.0 Rev. 2.1	Chloride	5.0		mg Cl/L	P393522	
		Sulfate	5.5		mg SO4/L	P393524	
	SM 2120 B-2011	Color (true)	21		PCU	P393147	
	SM 2320 B-2011	Total Alkalinity	23		mg CaCO3/L	P393236	
	SM 2540 C-2011	TDS	47		mg/L	P393489	
	SM 2540 D-2011	TSS	12		mg/L	P393538	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P393239	
2222263	EPA 350.1 Rev. 2.0	Ammonia-N	0.050		mg N/L	P393514	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.34		mg N/L	P393549	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.20		mg N/L	P393227	
	EPA 365.1 Rev. 2.0	Total-P	0.041		mg P/L	P393397	
	SM 5310 B-2011	Organic Carbon	4.5		mg C/L	P393264	
2222265	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.014		mg P/L	P393159	
2222269	EPA 200.7 Rev. 4.4	Barium	23.4		ug/L	P393199	
		Calcium	8.72		mg/L	P393199	
		Iron	990		ug/L	P393199	
		Magnesium	1.11		mg/L	P393199	
		Manganese	38.3		ug/L	P393199	
		Potassium	0.90	I	mg/L	P393199	
		Sodium	5.2		mg/L	P393199	
		Zinc	5.0	U	ug/L	P393199	
	EPA 200.8 Rev. 5.4	Aluminum	149		ug/L	P393199	
		Antimony	0.050	U	ug/L	P393199	
		Arsenic	0.46		ug/L	P393199	
		Beryllium	0.054		ug/L	P393199	
		Boron**	9.1		ug/L	P393199	
		Cadmium	0.020	U	ug/L	P393199	
		Chromium	0.43	I	ug/L	P393199	
		Copper	0.46	I	ug/L	P393199	
		Lead	0.39	I	ug/L	P393199	
		Nickel	0.58	I	ug/L	P393199	
		Selenium	0.20	U	ug/L	P393199	
		Silver	0.010	U	ug/L	P393199	
		Thallium	0.10	U	ug/L	P393199	
	SM 2340B	Hardness	26.4		mg/L	P393199	

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: P393156

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P393199

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: P393199

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: P393522

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393524

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393514

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: P393548

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393549

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393227

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393397

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393159

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

Reference Method: SM 2120 B-2011
Batch ID: P393147

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P393236

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

Reference Method: SM 2540 C-2011
Batch ID: P393488

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-2011
Batch ID: P393489

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-2011
Batch ID: P393537

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P393538

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P393239

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P393264

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: P393199

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.1		P	85 - 115
Calcium	103		P	85 - 115
Iron	102		P	85 - 115
Magnesium	103		P	85 - 115
Manganese	101		P	85 - 115
Potassium	98.1		P	85 - 115
Sodium	102		P	85 - 115
Zinc	97.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P393199

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	101		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	97.3		P	85 - 115
Beryllium	87.6		P	85 - 115
Boron	101		P	85 - 115
Cadmium	93.5		P	85 - 115
Chromium	93.2		P	85 - 115
Copper	96.4		P	85 - 115
Lead	98.3		P	85 - 115
Nickel	93.8		P	85 - 115
Selenium	97.8		P	85 - 115
Silver	105		P	85 - 115
Thallium	97.0		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393522

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393524

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393514

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393548

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393549

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393227

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: P393397

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393159

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

Reference Method: SM 2120 B-2011
Batch ID: P393147

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.8		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P393236

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	93.4		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P393239

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.7		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P393264

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P393199

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221998	Barium	99.7		P	80 - 120
2221998	Calcium	99.2		P	80 - 120
2221998	Iron	104		P	80 - 120
2221998	Magnesium	102		P	80 - 120
2221998	Manganese	101		P	80 - 120
2221998	Potassium	99.5		P	80 - 120
2221998	Sodium	101		P	80 - 120
2221998	Zinc	101		P	80 - 120
2222268	Barium	100	104	P/P	80 - 120
2222268	Calcium	104		P	80 - 120
2222268	Iron	102	107	P/P	80 - 120
2222268	Magnesium	104	109	P/P	80 - 120
2222268	Manganese	101	105	P/P	80 - 120
2222268	Potassium	99.1	104	P/P	80 - 120
2222268	Sodium	102		P	80 - 120
2222268	Zinc	99.1	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P393199

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2221998	Aluminum	98.3		P	80 - 120
2221998	Antimony	104		P	80 - 120
2221998	Arsenic	96.5		P	80 - 120
2221998	Beryllium	87.2		P	80 - 120
2221998	Boron	98.8		P	80 - 120
2221998	Cadmium	94.2		P	80 - 120
2221998	Chromium	93.1		P	80 - 120
2221998	Copper	93.5		P	80 - 120
2221998	Lead	96.6		P	80 - 120
2221998	Nickel	92.2		P	80 - 120
2221998	Selenium	94.6		P	80 - 120
2221998	Silver	105		P	80 - 120
2221998	Thallium	97.1		P	80 - 120
2222268	Aluminum	97.9	95.2	P/P	80 - 120
2222268	Antimony	96.5	95.5	P/P	80 - 120
2222268	Arsenic	93.4	92.8	P/P	80 - 120
2222268	Beryllium	86.2	82.8	P/P	80 - 120
2222268	Boron	98.5	99.4	P/P	80 - 120
2222268	Cadmium	93.1	93.0	P/P	80 - 120
2222268	Chromium	89.8	90.1	P/P	80 - 120
2222268	Copper	86.2	87.4	P/P	80 - 120
2222268	Lead	97.0	95.4	P/P	80 - 120
2222268	Nickel	90.1	91.3	P/P	80 - 120
2222268	Selenium	90.9	89.6	P/P	80 - 120
2222268	Silver	104	103	P/P	80 - 120
2222268	Thallium	96.9	95.9	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393522

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: P393522

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222225	Chloride	101		P	90 - 110
2222389	Chloride	99.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393524

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222225	Sulfate	102		P	90 - 110
2222389	Sulfate	96.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222231	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393548

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222233	Kjeldahl Nitrogen	105	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393549

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222280	Kjeldahl Nitrogen	107	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393227

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222232	NO2NO3-N	96.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393397

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222314	Total-P	102	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393159

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222264	O-Phosphate-P	98.8	98.9	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P393239

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222389	Fluoride	98.0	96.8	P/P	94 - 107

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P393264

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2222234	Organic Carbon	102	101	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P393156

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222225	Turbidity	3.41	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P393199

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222268	Barium	3.81	Spike	P	0 - 20
2222268	Calcium	3.52	Spike	P	0 - 20
2222268	Iron	3.24	Spike	P	0 - 20
2222268	Magnesium	3.85	Spike	P	0 - 20
2222268	Manganese	3.47	Spike	P	0 - 20
2222268	Potassium	3.64	Spike	P	0 - 20
2222268	Sodium	3.91	Spike	P	0 - 20
2222268	Zinc	3.04	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P393199

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222268	Aluminum	1.56	Spike	P	0 - 20
2222268	Antimony	0.983	Spike	P	0 - 20
2222268	Arsenic	0.636	Spike	P	0 - 20
2222268	Beryllium	3.42	Spike	P	0 - 20
2222268	Boron	0.896	Spike	P	0 - 20
2222268	Cadmium	0.113	Spike	P	0 - 20
2222268	Chromium	0.258	Spike	P	0 - 20
2222268	Copper	1.26	Spike	P	0 - 20
2222268	Lead	1.63	Spike	P	0 - 20
2222268	Nickel	1.24	Spike	P	0 - 20
2222268	Selenium	1.46	Spike	P	0 - 20
2222268	Silver	0.440	Spike	P	0 - 20
2222268	Thallium	0.987	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393522

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222389	Chloride	1.43	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P393524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222389	Sulfate	2.06	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393514

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222231	Ammonia-N	0.423	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393548

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222233	Kjeldahl Nitrogen	0.707	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393549

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222280	Kjeldahl Nitrogen	2.80	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393227

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222232	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393397

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222314	Total-P	4.69	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393159

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222264	O-Phosphate-P	0.0901	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P393147

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222225	Color (true)	0.534	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P393236

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222389	Total Alkalinity	0.279	Sample	P	0 - 8.1

Quality Assurance Report
Precision

Reference Method: SM 2540 C-2011
Batch ID: P393488

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222178	TDS	8.22	Sample	P	0 - 10

Reference Method: SM 2540 C-2011
Batch ID: P393489

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222311	TDS	2.17	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P393239

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222389	Fluoride	1.01	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P393264

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2222234	Organic Carbon	1.00	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: A103321
Included Lab Sample IDs: 2222260, 2222261

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A103324
Included Lab Sample IDs: 2222260, 2222261

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	100	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A103325
Included Lab Sample IDs: 2222264, 2222265

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A103358
Included Lab Sample IDs: 2222262, 2222263

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

Reference Method: SM 2320 B-2011
Run ID: A103361
Included Lab Sample IDs: 2222260, 2222261

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.9	95.1	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A103361
Included Lab Sample IDs: 2222260, 2222261

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	103	95.9	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A103374
Included Lab Sample IDs: 2222262, 2222263

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A103378
Included Lab Sample IDs: 2222268, 2222269

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A103378
Included Lab Sample IDs: 2222268, 2222269

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	104	104	P/P	90 - 110
Magnesium	103	104	P/P	90 - 110
Manganese	103	105	P/P	90 - 110
Potassium	98.8	103	P/P	90 - 110
Sodium	99.3	104	P/P	90 - 110
Zinc	106	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A103475
Included Lab Sample IDs: 2222262, 2222263

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A103478
Included Lab Sample IDs: 2222262, 2222263

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	102	P/P	90 - 110
Ammonia-N	102	103	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A103481
Included Lab Sample IDs: 2222260, 2222261

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A103527
Included Lab Sample IDs: 2222262, 2222263

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	105	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A103548
Included Lab Sample IDs: 2222268, 2222269

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	102	P/P	90 - 110
Antimony	102	103	P/P	90 - 110
Arsenic	97.6	99.2	P/P	90 - 110
Beryllium	93.6	94.2	P/P	90 - 110
Cadmium	98.9	99.7	P/P	90 - 110
Chromium	95.6	97.5	P/P	90 - 110
Copper	98.0	99.7	P/P	90 - 110
Lead	102	102	P/P	90 - 110
Nickel	97.1	97.7	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A103548
Included Lab Sample IDs: 2222268, 2222269

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Selenium	95.8	97.7	P/P	90 - 110
Silver	104	106	P/P	90 - 110
Thallium	105	105	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A103595
Included Lab Sample IDs: 2222268, 2222269

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	102	97.3	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						3.41	
EPA 200.7 Rev. 4.4	Barium	99.1	99.7	100	104			3.81
	Calcium	103	99.2	104				3.52
	Iron	102	104	102	107			3.24
	Magnesium	103	102	104	109			3.85
	Manganese	101	101	101	105			3.47
	Potassium	98.1	99.5	99.1	104			3.64
	Sodium	102	101	102				3.91
	Zinc	97.7	101	99.1	102			3.04
EPA 200.8 Rev. 5.4	Aluminum	101	98.3	97.9	95.2			1.56
	Antimony	104	104	96.5	95.5			0.983
	Arsenic	97.3	96.5	93.4	92.8			0.636
	Beryllium	87.6	87.2	86.2	82.8			3.42
	Boron	101	98.8	98.5	99.4			0.896
	Cadmium	93.5	94.2	93.1	93.0			0.113
	Chromium	93.2	93.1	89.8	90.1			0.258
	Copper	96.4	93.5	86.2	87.4			1.26
	Lead	98.3	96.6	97.0	95.4			1.63
	Nickel	93.8	92.2	90.1	91.3			1.24
	Selenium	97.8	94.6	90.9	89.6			1.46
	Silver	105	105	104	103			0.440
	Thallium	97.0	97.1	96.9	95.9			0.987
EPA 300.0 Rev. 2.1	Chloride	101	99.5	101			1.43	
	Sulfate	100	96.1	102			2.06	
EPA 350.1 Rev. 2.0	Ammonia-N	101	101	102				0.423
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	105	106				0.707
	Kjeldahl Nitrogen	102	107	103				2.80
EPA 353.2 Rev. 2.0	NO2NO3-N	100	96.2					0.0
EPA 365.1 Rev. 2.0	Total-P	103	102	107				4.69
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	98.8	98.9				0.0901
SM 2120 B-2011	Color (true)	99.8					0.534	
SM 2320 B-2011	Total Alkalinity	93.4					0.279	
SM 2540 C-2011	TDS						8.22	
	TDS						2.17	
SM 4500 F-C-2011	Fluoride	98.7	98.0	96.8				1.01
SM 5310 B-2011	Organic Carbon	99.8	102	101				1.00

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2222260, 2222261
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2222268, 2222269
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2222268, 2222269
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2222260, 2222261
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2222260, 2222261
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2222262, 2222263
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2222262, 2222263
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2222262, 2222263
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2222262, 2222263
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2222264, 2222265

Reference Method Descriptions

Method	Description	Associated Samples
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2222260, 2222261
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2222260, 2222261
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2222268, 2222269
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2222260, 2222261
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2222260, 2222261
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2222260, 2222261
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2222262, 2222263

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	01/29/2021			01/29/2021 15:23	Yen Ta	2222260, 2222261
EPA 200.7 Rev. 4.4	01/29/2021	02/01/2021 14:15	Elliott D. Healy	02/02/2021 17:59	Betina Topolski	2222268
	01/29/2021	02/01/2021 14:15	Elliott D. Healy	02/02/2021 18:30	Betina Topolski	2222269
EPA 200.8 Rev. 5.4	01/29/2021	02/01/2021 14:15	Elliott D. Healy	02/12/2021 01:45	Alexander Thompson	2222269
	01/29/2021	02/01/2021 14:15	Elliott D. Healy	02/12/2021 01:53	Alexander Thompson	2222268
	01/29/2021	02/01/2021 14:15	Elliott D. Healy	02/15/2021 13:16	Alexander Thompson	2222268
	01/29/2021	02/01/2021 14:15	Elliott D. Healy	02/15/2021 13:22	Alexander Thompson	2222269
EPA 300.0 Rev. 2.1	01/29/2021			02/08/2021 21:30	Lipi Saha	2222260
	01/29/2021			02/08/2021 21:42	Lipi Saha	2222261
EPA 350.1 Rev. 2.0	01/29/2021			02/08/2021 17:47	Ping Hua	2222262
	01/29/2021			02/08/2021 17:56	Ping Hua	2222263
EPA 351.2 Rev. 2.0	01/29/2021	02/09/2021 11:53	Yen Ta	02/10/2021 15:59	Julia Storbeck	2222262
	01/29/2021	02/09/2021 11:53	Yen Ta	02/10/2021 16:08	Julia Storbeck	2222263
EPA 353.2 Rev. 2.0	01/29/2021			02/02/2021 10:20	Beverly Y. Sanders	2222262
	01/29/2021			02/02/2021 10:21	Beverly Y. Sanders	2222263
EPA 365.1 Rev. 2.0	01/29/2021	02/04/2021 17:06	Madeline Gruver	02/08/2021 13:37	Shengyu Wang	2222262
	01/29/2021	02/04/2021 17:06	Madeline Gruver	02/08/2021 13:38	Shengyu Wang	2222263
EPA 365.1 Rev. 2.0 dissolved	01/29/2021			01/29/2021 16:22	Ping Hua	2222264
	01/29/2021			01/29/2021 16:24	Ping Hua	2222265
SM 2120 B-2011	01/29/2021			01/29/2021 16:00	Benjamin T. Nordmann	2222260
	01/29/2021			01/29/2021 16:01	Benjamin T. Nordmann	2222261
SM 2320 B-2011	01/29/2021			02/02/2021 07:18	Dale L. Simmons	2222260
	01/29/2021			02/02/2021 07:30	Dale L. Simmons	2222261
SM 2340B	01/29/2021			02/02/2021 17:59	Betina Topolski	2222268
	01/29/2021			02/02/2021 18:30	Betina Topolski	2222269
SM 2540 C-2011	01/29/2021			02/02/2021 14:20	Yijie Li	2222260, 2222261
SM 2540 D-2011	01/29/2021			02/02/2021 14:20	Yijie Li	2222260, 2222261
SM 4500 F-C-2011	01/29/2021			02/02/2021 07:18	Dale L. Simmons	2222260
	01/29/2021			02/02/2021 07:30	Dale L. Simmons	2222261
SM 5310 B-2011	01/29/2021			02/02/2021 04:55	Madeline Gruver	2222262
	01/29/2021			02/02/2021 05:07	Madeline Gruver	2222263