Chemical Analysis Report

NE-DIST-2020-10-21-02

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

Event Description: **Nassauwannee Lakes**
Request ID: **RQ-2020-10-19-32**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
8800 Baymeadows Way West
Suite 100
Jacksonville, FL 32256
Attn: Jeremy Parrish

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: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 12-NOV-2020 15:31

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: Ocean Pond Center **Collection Date/Time: 10/20/2020 11:50**

Field ID: 21010011 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2203746	EPA 180.1 Rev. 2.0	Turbidity	2.6		NTU	P389055	
	EPA 300.0 Rev. 2.1	Chloride	7.8		mg Cl/L	P389374	
		Sulfate	1.9		mg SO4/L	P389377	
	SM 2120 B-2011	Color (true)	110	A	PCU	P389052	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P389229	
	SM 2540 C-2011	TDS	42		mg/L	P389660	
	SM 2540 D-2011	TSS	2	I	mg/L	P389608	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P389235	
2203748	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P389209	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.45		mg N/L	P389191	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P389246	
	EPA 365.1 Rev. 2.0	Total-P	0.017		mg P/L	P389260	
	SM 5310 B-2011	Organic Carbon	13		mg C/L	P389221	
2203750	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P389047	
2203754	EPA 200.7 Rev. 4.4	Barium	7.6		ug/L	P389253	
		Calcium	1.38		mg/L	P389253	
		Iron	560		ug/L	P389253	
		Magnesium	0.76		mg/L	P389253	
		Potassium	0.30	U	mg/L	P389253	
		Sodium	4.1		mg/L	P389253	
		Zinc	5.0	U	ug/L	P389253	
	EPA 200.8 Rev. 5.4	Aluminum	300		ug/L	P389253	
		Antimony	0.064	I	ug/L	P389253	
		Arsenic	0.55		ug/L	P389253	
		Beryllium	0.033	I	ug/L	P389253	
		Boron**	18.7		ug/L	P389253	
		Cadmium	0.020	U	ug/L	P389253	
		Chromium	0.40	U	ug/L	P389253	
		Copper	0.40	U	ug/L	P389253	
		Lead	0.57		ug/L	P389253	
		Nickel	0.50	U	ug/L	P389253	
		Selenium	0.20	U	ug/L	P389253	
		Silver	0.010	U	ug/L	P389253	
		Thallium	0.10	U	ug/L	P389253	
	SM 2340B	Hardness	6.6		mg/L	P389253	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: The lead result was confirmed in the undigested sample on 11/09/2020.

Sample Location: Palestine Lake Center **Collection Date/Time: 10/20/2020 10:40**

Field ID: 19010044 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2203747	EPA 180.1 Rev. 2.0	Turbidity	5.6		NTU	P389055	
	EPA 300.0 Rev. 2.1	Chloride	8.7		mg Cl/L	P389374	
		Sulfate	4.2		mg SO4/L	P389377	
	SM 2120 B-2011	Color (true)	70		PCU	P389052	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P389229	
	SM 2540 C-2011	TDS	46		mg/L	P389660	
	SM 2540 D-2011	TSS	3	I	mg/L	P389608	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P389235	
2203749	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	I	mg N/L	P389209	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P389327	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P389246	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P389260	
	SM 5310 B-2011	Organic Carbon	10		mg C/L	P389221	
2203751	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P389047	
2203755	EPA 200.7 Rev. 4.4	Barium	9.7		ug/L	P389253	
		Calcium	1.67		mg/L	P389253	
		Iron	190		ug/L	P389253	
		Magnesium	1.25		mg/L	P389253	
		Potassium	0.41	I	mg/L	P389253	
		Sodium	4.8		mg/L	P389253	
		Zinc	5.0	U	ug/L	P389253	
	EPA 200.8 Rev. 5.4	Aluminum	132		ug/L	P389253	
		Antimony	0.10	I	ug/L	P389253	
		Arsenic	0.38		ug/L	P389253	
		Beryllium	0.011	I	ug/L	P389253	
		Boron**	23.4		ug/L	P389253	
		Cadmium	0.020	U	ug/L	P389253	
		Chromium	0.40	U	ug/L	P389253	
		Copper	0.40	U	ug/L	P389253	
		Lead	0.44		ug/L	P389253	
		Nickel	0.50	U	ug/L	P389253	
		Selenium	0.20	U	ug/L	P389253	
		Silver	0.010	U	ug/L	P389253	
		Thallium	0.10	U	ug/L	P389253	
	SM 2340B	Hardness	9.3		mg/L	P389253	

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: P389055

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P389253

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: P389253

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: P389374

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P389377

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P389209

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: P389191

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389327

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P389246

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P389260

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P389047

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

Reference Method: SM 2120 B-2011
Batch ID: P389052

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P389229

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

Reference Method: SM 2540 C-2011
Batch ID: P389660

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P389608

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P389235

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P389221

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: P389253

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	101		P	85 - 115
Calcium	105		P	85 - 115
Iron	104		P	85 - 115
Magnesium	103		P	85 - 115
Potassium	102		P	85 - 115
Sodium	99.4		P	85 - 115
Zinc	96.8		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P389253

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.5		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	96.8		P	85 - 115
Beryllium	93.1		P	85 - 115
Boron	99.3		P	85 - 115
Cadmium	100		P	85 - 115
Chromium	98.4		P	85 - 115
Copper	98.8		P	85 - 115
Lead	95.6		P	85 - 115
Nickel	98.1		P	85 - 115
Selenium	93.8		P	85 - 115
Silver	102		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P389374

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P389377

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P389209

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: P389191

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389327

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P389246

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P389260

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	106		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P389047

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.3		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P389052

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

Reference Method: SM 2320 B-2011
Batch ID: P389229

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P389235

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.6		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P389221

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P389253

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203925	Barium	100		P	80 - 120
2203925	Calcium	98.0		P	80 - 120
2203925	Iron	106		P	80 - 120
2203925	Magnesium	97.1		P	80 - 120
2203925	Potassium	94.4		P	80 - 120
2203925	Sodium	95.9		P	80 - 120
2203925	Zinc	97.8		P	80 - 120
2204072	Barium	98.7	99.3	P/P	80 - 120
2204072	Calcium	105	106	P/P	80 - 120
2204072	Iron	105	103	P/P	80 - 120
2204072	Magnesium	106	104	P/P	80 - 120
2204072	Potassium	103	103	P/P	80 - 120
2204072	Sodium	96.9		P	80 - 120
2204072	Zinc	97.9	97.2	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P389253

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203925	Aluminum	96.9		P	80 - 120
2203925	Antimony	101		P	80 - 120
2203925	Arsenic	99.5		P	80 - 120
2203925	Beryllium	100		P	80 - 120
2203925	Boron	96.6		P	80 - 120
2203925	Cadmium	99.1		P	80 - 120
2203925	Chromium	99.5		P	80 - 120
2203925	Copper	100		P	80 - 120
2203925	Lead	95.4		P	80 - 120
2203925	Nickel	99.0		P	80 - 120
2203925	Selenium	95.0		P	80 - 120
2203925	Silver	102		P	80 - 120
2203925	Thallium	104		P	80 - 120
2204072	Aluminum	93.8	96.8	P/P	80 - 120
2204072	Antimony	97.4	99.6	P/P	80 - 120
2204072	Arsenic	95.2	97.6	P/P	80 - 120
2204072	Beryllium	92.8	95.0	P/P	80 - 120
2204072	Boron	92.9	96.6	P/P	80 - 120
2204072	Cadmium	95.2	98.6	P/P	80 - 120
2204072	Chromium	97.2	98.4	P/P	80 - 120
2204072	Copper	98.4	102	P/P	80 - 120
2204072	Lead	92.5	95.5	P/P	80 - 120
2204072	Nickel	95.5	97.7	P/P	80 - 120
2204072	Selenium	94.6	96.4	P/P	80 - 120
2204072	Silver	101	102	P/P	80 - 120
2204072	Thallium	101	104	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P389374

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203665	Chloride	105		P	90 - 110
2203917	Chloride	102		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P389377

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203665	Sulfate	105		P	90 - 110
2203917	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P389209

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203928	Ammonia-N	102	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389191

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203698	Kjeldahl Nitrogen	106	116	P/F	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389327

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2204422	Kjeldahl Nitrogen	113	99.5	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P389246

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203709	NO2NO3-N	96.2	95.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P389260

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203710	Total-P	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P389047

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203699	O-Phosphate-P	98.8	99.1	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P389235

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2204122	Fluoride	98.5	98.5	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P389221

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203673	Organic Carbon	99.3	100	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P389055

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203734	Turbidity	2.67	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P389253

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2204072	Barium	0.618	Spike	P	0 - 20
2204072	Calcium	0.505	Spike	P	0 - 20
2204072	Iron	2.24	Spike	P	0 - 20
2204072	Magnesium	1.59	Spike	P	0 - 20
2204072	Potassium	0.500	Spike	P	0 - 20
2204072	Sodium	0.316	Spike	P	0 - 20
2204072	Zinc	0.720	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P389253

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2204072	Aluminum	3.01	Spike	P	0 - 20
2204072	Antimony	2.27	Spike	P	0 - 20
2204072	Arsenic	2.39	Spike	P	0 - 20
2204072	Beryllium	2.40	Spike	P	0 - 20
2204072	Boron	3.08	Spike	P	0 - 20
2204072	Cadmium	3.54	Spike	P	0 - 20
2204072	Chromium	1.20	Spike	P	0 - 20
2204072	Copper	3.68	Spike	P	0 - 20
2204072	Lead	3.11	Spike	P	0 - 20
2204072	Nickel	2.29	Spike	P	0 - 20
2204072	Selenium	1.93	Spike	P	0 - 20
2204072	Silver	1.39	Spike	P	0 - 20
2204072	Thallium	3.31	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P389374

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203917	Chloride	0.123	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P389377

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203917	Sulfate	0.375	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P389209

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203928	Ammonia-N	0.0204	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389191

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203698	Kjeldahl Nitrogen	8.62	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389327

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2204422	Kjeldahl Nitrogen	10.8	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P389246

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203709	NO2NO3-N	0.477	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P389260

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203710	Total-P	1.69	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P389047

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203699	O-Phosphate-P	0.290	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P389052

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203746	Color (true)	1.72	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P389229

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2204122	Total Alkalinity	1.10	Sample	P	0 - 8.1

Quality Assurance Report
Precision

Reference Method: SM 2540 C-2011
Batch ID: P389660

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203943	TDS	5.31	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P389235

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2204122	Fluoride	0.0	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P389221

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203673	Organic Carbon	0.759	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A101664
Included Lab Sample IDs: 2203750, 2203751

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.3	99.0	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A101665
Included Lab Sample IDs: 2203746, 2203747

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A101666
Included Lab Sample IDs: 2203746, 2203747

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	99.5	P/P	95 - 105

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A101740
Included Lab Sample IDs: 2203748, 2203749

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

Reference Method: SM 5310 B-2011
Run ID: A101747
Included Lab Sample IDs: 2203748, 2203749

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

Reference Method: SM 2320 B-2011
Run ID: A101749
Included Lab Sample IDs: 2203746, 2203747

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.5	99.3	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A101749
Included Lab Sample IDs: 2203746, 2203747

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A101763
Included Lab Sample IDs: 2203748, 2203749

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	99.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A101768
Included Lab Sample IDs: 2203748

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A101798
Included Lab Sample IDs: 2203746, 2203747

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A101803
Included Lab Sample IDs: 2203748, 2203749

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	95.5	95.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A101807
Included Lab Sample IDs: 2203754, 2203755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	98.4	97.2	P/P	90 - 110
Calcium	100	99.0	P/P	90 - 110
Iron	102	100	P/P	90 - 110
Magnesium	99.7	98.8	P/P	90 - 110
Potassium	98.6	97.4	P/P	90 - 110
Sodium	98.7	97.4	P/P	90 - 110
Zinc	97.1	97.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A101820
Included Lab Sample IDs: 2203749

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A102002
Included Lab Sample IDs: 2203754, 2203755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	94.2	94.3	P/P	90 - 110
Antimony	98.7	97.3	P/P	90 - 110
Arsenic	96.3	97.0	P/P	90 - 110
Beryllium	98.7	100	P/P	90 - 110
Boron	99.4	99.5	P/P	90 - 110
Cadmium	96.9	96.8	P/P	90 - 110
Chromium	95.2	95.2	P/P	90 - 110
Nickel	96.1	95.5	P/P	90 - 110
Selenium	96.1	96.4	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A102002
Included Lab Sample IDs: 2203754, 2203755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	105	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A102029
Included Lab Sample IDs: 2203754, 2203755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	96.8	97.3	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A102030
Included Lab Sample IDs: 2203754, 2203755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	95.7	94.9	P/P	90 - 110
Thallium	97.7	96.7	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						2.67	
EPA 200.7 Rev. 4.4	Barium	101	100	98.7	99.3			0.618
	Calcium	105	98.0	105	106			0.505
	Iron	104	106	105	103			2.24
	Magnesium	103	97.1	106	104			1.59
	Potassium	102	94.4	103	103			0.500
	Sodium	99.4	95.9	96.9				0.316
	Zinc	96.8	97.8	97.9	97.2			0.720
EPA 200.8 Rev. 5.4	Aluminum	97.5	93.8	96.8	96.9			3.01
	Antimony	100	97.4	99.6	101			2.27
	Arsenic	96.8	95.2	97.6	99.5			2.39
	Beryllium	93.1	92.8	95.0	100			2.40
	Boron	99.3	92.9	96.6	96.6			3.08
	Cadmium	100	95.2	98.6	99.1			3.54
	Chromium	98.4	97.2	98.4	99.5			1.20
	Copper	98.8	98.4	102	100			3.68
	Lead	95.6	92.5	95.5	95.4			3.11
	Nickel	98.1	95.5	97.7	99.0			2.29
	Selenium	93.8	94.6	96.4	95.0			1.93
	Silver	102	101	102	102			1.39
	Thallium	102	101	104	104			3.31
EPA 300.0 Rev. 2.1	Chloride	103	102	105			0.123	
	Sulfate	103	101	105			0.375	
EPA 350.1 Rev. 2.0	Ammonia-N	101	102	102				0.0204
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	106	116				8.62
	Kjeldahl Nitrogen	108	113	99.5				10.8
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	96.2	95.6				0.477
EPA 365.1 Rev. 2.0	Total-P	106	102	104				1.69
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.3	98.8	99.1				0.290
SM 2120 B-2011	Color (true)	101					1.72	
SM 2320 B-2011	Total Alkalinity	101					1.10	
SM 2540 C-2011	TDS						5.31	
SM 4500 F-C-2011	Fluoride	98.6	98.5	98.5				0.0
SM 5310 B-2011	Organic Carbon	100	99.3	100				0.759

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2203746, 2203747
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2203754, 2203755
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2203754, 2203755
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2203746, 2203747
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2203746, 2203747
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2203748, 2203749
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2203748, 2203749
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2203748, 2203749
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2203748, 2203749
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2203750, 2203751
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2203746, 2203747
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2203746, 2203747

Reference Method Descriptions

Method	Description	Associated Samples
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2203754, 2203755
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2203746, 2203747
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2203746, 2203747
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2203746, 2203747
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2203748, 2203749

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	10/21/2020			10/21/2020 17:12	Samantha Davila	2203746, 2203747
EPA 200.7 Rev. 4.4	10/21/2020	10/26/2020 13:40	Elliott D. Healy	10/27/2020 14:23	Betina Topolski	2203754
	10/21/2020	10/26/2020 13:40	Elliott D. Healy	10/27/2020 14:31	Betina Topolski	2203755
EPA 200.8 Rev. 5.4	10/21/2020	10/26/2020 13:40	Elliott D. Healy	11/05/2020 20:38	Alexander Thompson	2203754
	10/21/2020	10/26/2020 13:40	Elliott D. Healy	11/05/2020 20:46	Alexander Thompson	2203755
	10/21/2020	10/26/2020 13:40	Elliott D. Healy	11/06/2020 13:27	Alexander Thompson	2203754
	10/21/2020	10/26/2020 13:40	Elliott D. Healy	11/06/2020 13:32	Alexander Thompson	2203755
	10/21/2020	10/26/2020 13:40	Elliott D. Healy	11/06/2020 21:37	Alexander Thompson	2203754
	10/21/2020	10/26/2020 13:40	Elliott D. Healy	11/06/2020 21:41	Alexander Thompson	2203755
EPA 300.0 Rev. 2.1	10/21/2020			10/28/2020 08:37	Lipi Saha	2203746
	10/21/2020			10/28/2020 08:51	Lipi Saha	2203747
EPA 350.1 Rev. 2.0	10/21/2020			10/25/2020 11:07	Ping Hua	2203748
	10/21/2020			10/25/2020 11:08	Ping Hua	2203749
EPA 351.2 Rev. 2.0	10/21/2020	10/23/2020 14:03	David Boose	10/26/2020 11:23	Elliott Rodriguez	2203748
	10/21/2020	10/27/2020 13:07	David Boose	10/28/2020 11:31	Elliott Rodriguez	2203749
EPA 353.2 Rev. 2.0	10/21/2020			10/26/2020 10:26	Beverly Y. Sanders	2203748
	10/21/2020			10/26/2020 10:27	Beverly Y. Sanders	2203749
EPA 365.1 Rev. 2.0	10/21/2020	10/26/2020 13:20	Yen Ta	10/27/2020 15:47	Shengyu Wang	2203748
	10/21/2020	10/26/2020 13:20	Yen Ta	10/27/2020 15:48	Shengyu Wang	2203749
EPA 365.1 Rev. 2.0 dissolved	10/21/2020			10/21/2020 16:10	Blanca Fach	2203750
	10/21/2020			10/21/2020 16:11	Blanca Fach	2203751
SM 2120 B-2011	10/21/2020			10/21/2020 17:16	Benjamin T. Nordmann	2203746, 2203747
SM 2320 B-2011	10/21/2020			10/24/2020 02:06	Samantha Davila	2203746
	10/21/2020			10/24/2020 02:16	Samantha Davila	2203747
SM 2340B	10/21/2020			10/27/2020 14:23	Betina Topolski	2203754
	10/21/2020			10/27/2020 14:31	Betina Topolski	2203755
SM 2540 C-2011	10/21/2020			10/26/2020 15:36	Yijie Li	2203746, 2203747
SM 2540 D-2011	10/21/2020			10/26/2020 15:36	Yijie Li	2203746, 2203747
SM 4500 F-C-2011	10/21/2020			10/24/2020 02:06	Samantha Davila	2203746
	10/21/2020			10/24/2020 02:16	Samantha Davila	2203747
SM 5310 B-2011	10/21/2020			10/23/2020 21:01	Lauren Lees	2203748
	10/21/2020			10/23/2020 21:14	Lauren Lees	2203749