Chemical Analysis Report

NW-DIST-2020-03-27-01

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

Event Description: **Choctawhatchee Run**
Request ID: **RQ-2020-03-16-15**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
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160 Government Center
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Date Certified: 15-APR-2020 09:28

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: Choctawhatchee River South of Carlisle Lake **Collection Date/Time: 03/26/2020 10:55**

Field ID: G3NW0130 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2168332	EPA 300.0 Rev. 2.1	Chloride	4.5		mg Cl/L	P381946	
		Sulfate	2.7		mg SO4/L	P381950	
	SM 2320 B-2011	Total Alkalinity	31		mg CaCO3/L	P381658	
	SM 2540 C-2011	TDS	57		mg/L	P381901	
	SM 2540 D-2011	TSS	8	I	mg/L	P381894	
	SM 4500 F-C-2011	Fluoride	0.040	I	mg F/L	P381822	RPD
2168334	EPA 350.1 Rev. 2.0	Ammonia-N	0.029		mg N/L	P381445	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.35		mg N/L	P381599	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.40		mg N/L	P381693	
	EPA 365.1 Rev. 2.0	Total-P	0.050		mg P/L	P381541	
	SM 5310 B-2011	Organic Carbon	4.2		mg C/L	P381641	
2168340	EPA 200.7 Rev. 4.4	Barium	28.1		ug/L	P381775	
		Calcium	11.6		mg/L	P381775	
		Iron	1.72E+03		ug/L	P381775	
		Magnesium	2.13		mg/L	P381775	
		Potassium	1.2	I	mg/L	P381775	
		Sodium	3.3		mg/L	P381775	
		Zinc	5.0	U	ug/L	P381775	
	EPA 200.8 Rev. 5.4	Aluminum	460		ug/L	P382004	
		Antimony	0.050	U	ug/L	P381775	
		Arsenic	0.84		ug/L	P381775	
		Boron**	12.0		ug/L	P381775	
		Cadmium	0.020	U	ug/L	P381775	
		Chromium	0.73	I	ug/L	P381775	
		Copper	0.51	I	ug/L	P381775	
		Lead	0.40	I	ug/L	P381775	
		Nickel	0.52	I	ug/L	P381775	
		Selenium	0.20	U	ug/L	P381775	
		Silver	0.010	U	ug/L	P381775	
		Thallium	0.10	U	ug/L	P381775	
	SM 2340B	Hardness	37.7		mg/L	P381775	

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: Choctawhatchee River South of Carlisle Lake **Collection Date/Time: 03/26/2020 11:00**

Field ID: G3NW0130_DUP Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2168333	EPA 300.0 Rev. 2.1	Chloride	4.4		mg Cl/L	P381946	
		Sulfate	2.7		mg SO4/L	P381950	
	SM 2320 B-2011	Total Alkalinity	31		mg CaCO3/L	P381658	
	SM 2540 C-2011	TDS	54		mg/L	P381901	
	SM 2540 D-2011	TSS	9	I	mg/L	P381894	
	SM 4500 F-C-2011	Fluoride	0.039	I	mg F/L	P381822	RPD
2168335	EPA 350.1 Rev. 2.0	Ammonia-N	0.029		mg N/L	P381445	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.32		mg N/L	P381599	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.40		mg N/L	P381693	
	EPA 365.1 Rev. 2.0	Total-P	0.051		mg P/L	P381541	
	SM 5310 B-2011	Organic Carbon	4.3		mg C/L	P381641	
2168341	EPA 200.7 Rev. 4.4	Barium	26.9		ug/L	P381775	
		Calcium	11.2		mg/L	P381775	
		Iron	1.53E+03		ug/L	P381775	
		Magnesium	2.06		mg/L	P381775	
		Potassium	1.1	I	mg/L	P381775	
		Sodium	3.2		mg/L	P381775	
		Zinc	5.0	U	ug/L	P381775	
	EPA 200.8 Rev. 5.4	Aluminum	424		ug/L	P382004	
		Antimony	0.050	U	ug/L	P381775	
		Arsenic	0.72		ug/L	P381775	
		Boron**	11.1		ug/L	P381775	
		Cadmium	0.020	U	ug/L	P381775	
		Chromium	0.50	I	ug/L	P381775	
		Copper	0.48	I	ug/L	P381775	
		Lead	0.35	I	ug/L	P381775	
		Nickel	0.50	U	ug/L	P381775	
		Selenium	0.20	U	ug/L	P381775	
		Silver	0.010	U	ug/L	P381775	
		Thallium	0.10	U	ug/L	P381775	
	SM 2340B	Hardness	36.4		mg/L	P381775	

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: Choctawhatchee River South of Carlisle Lake **Collection Date/Time: 03/26/2020 11:05**

Field ID: FB_03262020 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2168336	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P381946	
		Sulfate	0.20	U	mg SO4/L	P381950	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P381658	
	SM 2540 C-2011	TDS	15	U	mg/L	P381901	
	SM 2540 D-2011	TSS	2	U	mg/L	P381894	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P381822	RPD
2168337	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P381445	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P381600	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P381693	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P381541	
	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P381642	
2168342	EPA 200.7 Rev. 4.4	Barium	1.0	U	ug/L	P381775	
		Calcium	0.075	U	mg/L	P381775	
		Iron	30	U	ug/L	P381775	
		Magnesium	0.040	U	mg/L	P381775	
		Potassium	0.30	U	mg/L	P381775	
		Sodium	0.50	U	mg/L	P381775	
		Zinc	5.0	U	ug/L	P381775	
	EPA 200.8 Rev. 5.4	Aluminum	5.0	U	ug/L	P381775	
		Antimony	0.050	U	ug/L	P381775	
		Arsenic	0.050	U	ug/L	P381775	
		Boron**	2.0	U	ug/L	P381775	
		Cadmium	0.020	U	ug/L	P381775	
		Chromium	0.40	U	ug/L	P381775	
		Copper	0.40	U	ug/L	P381775	
		Lead	0.20	U	ug/L	P381775	
		Nickel	0.50	U	ug/L	P381775	
		Selenium	0.20	U	ug/L	P381775	
		Silver	0.010	U	ug/L	P381775	
		Thallium	0.10	U	ug/L	P381775	
	SM 2340B	Hardness	0.35	U	mg/L	P381775	

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 200.7 Rev. 4.4
Batch ID: P381775

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: P381775

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P382004

Component	Result	Code	Units
Aluminum	5.0	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381946

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381950

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381445

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: P381599

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381600

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381693

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381541

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

Reference Method: SM 2320 B-2011
Batch ID: P381658

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

Reference Method: SM 2540 C-2011
Batch ID: P381901

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P381894

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P381822

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P381641

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P381642

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: P381775

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	100		P	85 - 115
Calcium	103		P	85 - 115
Iron	102		P	85 - 115
Magnesium	101		P	85 - 115
Potassium	97.8		P	85 - 115
Sodium	101		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381775

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	95.4		P	85 - 115
Antimony	97.8		P	85 - 115
Arsenic	97.3		P	85 - 115
Boron	100		P	85 - 115
Cadmium	97.7		P	85 - 115
Chromium	100		P	85 - 115
Copper	97.4		P	85 - 115
Lead	93.8		P	85 - 115
Nickel	96.4		P	85 - 115
Selenium	96.0		P	85 - 115
Silver	97.2		P	85 - 115
Thallium	94.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P382004

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	95.0		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381946

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381950

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381445

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381599

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381600

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381693

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381541

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

Reference Method: SM 2320 B-2011
Batch ID: P381658

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.9		P	98 - 107

Reference Method: SM 4500 F-C-2011
Batch ID: P381822

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.5		P	92 - 104

Reference Method: SM 5310 B-2011
Batch ID: P381641

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

Reference Method: SM 5310 B-2011
Batch ID: P381642

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.9		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381775

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168741	Barium	98.3	97.6	P/P	80 - 120
2168741	Calcium	105		P	80 - 120
2168741	Iron	98.7	100	P/P	80 - 120
2168741	Magnesium	102		P	80 - 120
2168741	Potassium	94.9	95.4	P/P	80 - 120
2168741	Sodium	93.7	93.7	P/P	80 - 120
2168741	Zinc	98.9	98.0	P/P	80 - 120
2168742	Barium	97.9		P	80 - 120
2168742	Calcium	99.3		P	80 - 120
2168742	Iron	99.8		P	80 - 120
2168742	Magnesium	98.2		P	80 - 120
2168742	Potassium	91.3		P	80 - 120
2168742	Sodium	100		P	80 - 120
2168742	Zinc	97.6		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381775

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168741	Aluminum	95.7	95.4	P/P	80 - 120
2168741	Antimony	99.9	99.6	P/P	80 - 120
2168741	Arsenic	98.8	99.0	P/P	80 - 120
2168741	Boron	101	99.3	P/P	80 - 120
2168741	Cadmium	102	99.9	P/P	80 - 120
2168741	Chromium	105	105	P/P	80 - 120
2168741	Copper	97.8	97.4	P/P	80 - 120
2168741	Lead	95.0	94.4	P/P	80 - 120
2168741	Nickel	96.2	96.7	P/P	80 - 120
2168741	Selenium	97.6	97.8	P/P	80 - 120
2168741	Silver	98.7	98.7	P/P	80 - 120
2168741	Thallium	97.1	98.0	P/P	80 - 120
2168742	Aluminum	94.7		P	80 - 120
2168742	Antimony	100		P	80 - 120
2168742	Arsenic	98.9		P	80 - 120
2168742	Boron	97.2		P	80 - 120
2168742	Cadmium	101		P	80 - 120
2168742	Chromium	102		P	80 - 120
2168742	Copper	96.1		P	80 - 120
2168742	Lead	95.2		P	80 - 120
2168742	Nickel	94.0		P	80 - 120
2168742	Selenium	96.8		P	80 - 120
2168742	Silver	98.9		P	80 - 120
2168742	Thallium	98.4		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P382004

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168340	Aluminum	100	98.3	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381946

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168297	Chloride	100		P	90 - 110
2168541	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381950

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168297	Sulfate	101		P	90 - 110
2168541	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381445

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168544	Ammonia-N	102	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381599

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168293	Kjeldahl Nitrogen	104	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381600

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168656	Kjeldahl Nitrogen	104	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381693

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168320	NO2NO3-N	98.0	98.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381541

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168300	Total-P	105	107	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P381822

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168117	Fluoride	98.6	95.2	P/P	91 - 105

Reference Method: SM 5310 B-2011
Batch ID: P381641

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168149	Organic Carbon	97.1	97.0	P/P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P381642

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2168590	Organic Carbon	95.3	95.5	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P381775

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168741	Barium	0.701	Spike	P	0 - 20
2168741	Calcium	0.0339	Spike	P	0 - 20
2168741	Iron	1.53	Spike	P	0 - 20
2168741	Magnesium	1.36	Spike	P	0 - 20
2168741	Potassium	0.454	Spike	P	0 - 20
2168741	Sodium	0.0149	Spike	P	0 - 20
2168741	Zinc	0.878	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P381775

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168741	Aluminum	0.267	Spike	P	0 - 20
2168741	Antimony	0.272	Spike	P	0 - 20
2168741	Arsenic	0.178	Spike	P	0 - 20
2168741	Boron	1.73	Spike	P	0 - 20
2168741	Cadmium	1.98	Spike	P	0 - 20
2168741	Chromium	0.215	Spike	P	0 - 20
2168741	Copper	0.406	Spike	P	0 - 20
2168741	Lead	0.673	Spike	P	0 - 20
2168741	Nickel	0.459	Spike	P	0 - 20
2168741	Selenium	0.105	Spike	P	0 - 20
2168741	Silver	0.0412	Spike	P	0 - 20
2168741	Thallium	0.837	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P382004

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168340	Aluminum	1.28	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381946

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168297	Chloride	0.131	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P381950

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168297	Sulfate	0.240	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381445

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168544	Ammonia-N	0.475	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381599

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168293	Kjeldahl Nitrogen	2.33	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P381600

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168656	Kjeldahl Nitrogen	0.0151	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381693

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168320	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P381541

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168300	Total-P	1.38	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P381658

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168101	Total Alkalinity	0.0219	Sample	P	0 - 3.3

Reference Method: SM 2540 C-2011
Batch ID: P381901

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168589	TDS	4.32	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P381822

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168117	Fluoride	2.98	Spike	F	0 - 2.0

Quality Assurance Report
Precision

Reference Method: SM 5310 B-2011
Batch ID: P381641

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168149	Organic Carbon	0.110	Spike	P	0 - 20

Reference Method: SM 5310 B-2011
Batch ID: P381642

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2168590	Organic Carbon	0.112	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A98492
Included Lab Sample IDs: 2168334, 2168335, 2168337

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A98548
Included Lab Sample IDs: 2168334, 2168335, 2168337

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	99.0	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A98573
Included Lab Sample IDs: 2168334, 2168335, 2168337

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.3	93.8	P/P	90 - 110
Organic Carbon	95.8	95.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A98579
Included Lab Sample IDs: 2168334, 2168335, 2168337

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

Reference Method: SM 2320 B-2011
Run ID: A98581
Included Lab Sample IDs: 2168332, 2168333, 2168336

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.6	99.8	P/P	90 - 110
Total Alkalinity	99.8	98.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A98590
Included Lab Sample IDs: 2168334, 2168335, 2168337

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

Reference Method: SM 4500 F-C-2011
Run ID: A98655
Included Lab Sample IDs: 2168332, 2168333, 2168336

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	96.6	97.2	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A98686
Included Lab Sample IDs: 2168332, 2168333, 2168336

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.6	98.9	P/P	90 - 110
Sulfate	101	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98700
Included Lab Sample IDs: 2168340, 2168341, 2168342

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.9	99.3	P/P	90 - 110
Antimony	98.6	99.9	P/P	90 - 110
Antimony	99.9	99.5	P/P	90 - 110
Arsenic	101	102	P/P	90 - 110
Arsenic	102	101	P/P	90 - 110
Boron	102	102	P/P	90 - 110
Boron	102	106	P/P	90 - 110
Cadmium	101	100	P/P	90 - 110
Cadmium	99.4	101	P/P	90 - 110
Chromium	101	103	P/P	90 - 110
Chromium	103	104	P/P	90 - 110
Copper	100	99.7	P/P	90 - 110
Copper	100	100	P/P	90 - 110
Lead	97.3	98.1	P/P	90 - 110
Lead	98.1	97.8	P/P	90 - 110
Nickel	101	102	P/P	90 - 110
Nickel	102	101	P/P	90 - 110
Selenium	101	100	P/P	90 - 110
Selenium	98.0	101	P/P	90 - 110
Silver	101	102	P/P	90 - 110
Silver	99.6	101	P/P	90 - 110
Thallium	93.5	94.2	P/P	90 - 110
Thallium	94.2	92.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A98711
Included Lab Sample IDs: 2168340, 2168341, 2168342

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	100	P/P	90 - 110
Calcium	101	103	P/P	90 - 110
Iron	102	103	P/P	90 - 110
Magnesium	100	101	P/P	90 - 110
Potassium	98.7	99.1	P/P	90 - 110
Sodium	101	101	P/P	90 - 110
Zinc	99.2	99.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98763
Included Lab Sample IDs: 2168340, 2168341

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.8	95.6	P/P	90 - 110

Quality Assurance Report
Calibration Verification

* 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 200.7 Rev. 4.4	Barium	100	98.3	97.6	97.9			0.701
	Calcium	103	105	99.3				0.0339
	Iron	102	98.7	100	99.8			1.53
	Magnesium	101	102	98.2				1.36
	Potassium	97.8	94.9	95.4	91.3			0.454
	Sodium	101	93.7	93.7	100			0.0149
	Zinc	100	98.9	98.0	97.6			0.878
EPA 200.8 Rev. 5.4	Aluminum	95.4	95.7	95.4	94.7			0.267
	Aluminum	95.0	100	98.3				1.28
	Antimony	97.8	99.9	99.6	100			0.272
	Arsenic	97.3	99.0	98.9	98.8			0.178
	Boron	100	101	99.3	97.2			1.73
	Cadmium	97.7	102	99.9	101			1.98
	Chromium	100	105	105	102			0.215
	Copper	97.4	97.8	97.4	96.1			0.406
	Lead	93.8	95.0	94.4	95.2			0.673
	Nickel	96.4	96.2	96.7	94.0			0.459
	Selenium	96.0	97.6	97.8	96.8			0.105
	Silver	97.2	98.7	98.7	98.9			0.0412
	Thallium	94.4	97.1	98.0	98.4			0.837
EPA 300.0 Rev. 2.1	Chloride	101	100	101			0.131	
	Sulfate	102	101	101			0.240	
EPA 350.1 Rev. 2.0	Ammonia-N	101	102	101				0.475
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	104	101				2.33
	Kjeldahl Nitrogen	106	104	104				0.0151
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	98.0	98.0				0.0
EPA 365.1 Rev. 2.0	Total-P	103	105	107				1.38
SM 2320 B-2011	Total Alkalinity	99.9					0.0219	
SM 2540 C-2011	TDS						4.32	
SM 4500 F-C-2011	Fluoride	97.5	98.6	95.2				2.98
SM 5310 B-2011	Organic Carbon	99.3	97.1	97.0				0.110
	Organic Carbon	95.9	95.3	95.5				0.112

Reference Method Descriptions

Method	Description	Associated Samples
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2168340, 2168341, 2168342
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2168340, 2168341, 2168342
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2168332, 2168333, 2168336
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2168332, 2168333, 2168336
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2168334, 2168335, 2168337
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2168334, 2168335, 2168337
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2168334, 2168335, 2168337
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2168334, 2168335, 2168337
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2168332, 2168333, 2168336
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2168340, 2168341, 2168342
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2168332, 2168333, 2168336
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2168332, 2168333, 2168336
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2168332, 2168333, 2168336
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2168334, 2168335, 2168337

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 200.7 Rev. 4.4	03/27/2020	04/03/2020 13:56	Alexander Thompson	04/08/2020 13:15	Betina Topolski	2168342
	03/27/2020	04/03/2020 13:56	Alexander Thompson	04/08/2020 14:03	Betina Topolski	2168340
	03/27/2020	04/03/2020 13:56	Alexander Thompson	04/08/2020 14:08	Betina Topolski	2168341
EPA 200.8 Rev. 5.4	03/27/2020	04/03/2020 13:56	Alexander Thompson	04/07/2020 13:55	Justin Cutchin	2168342
	03/27/2020	04/03/2020 13:56	Alexander Thompson	04/07/2020 16:15	Justin Cutchin	2168340
	03/27/2020	04/03/2020 13:56	Alexander Thompson	04/07/2020 16:22	Justin Cutchin	2168341
	03/27/2020	04/10/2020 15:05	Alexander Thompson	04/13/2020 22:55	Alexander Thompson	2168341
	03/27/2020	04/10/2020 15:05	Alexander Thompson	04/13/2020 23:02	Alexander Thompson	2168340
EPA 300.0 Rev. 2.1	03/27/2020			04/08/2020 05:06	Jhamieka S. Greenwood	2168332
	03/27/2020			04/08/2020 05:20	Jhamieka S. Greenwood	2168333
	03/27/2020			04/08/2020 05:33	Jhamieka S. Greenwood	2168336
EPA 350.1 Rev. 2.0	03/27/2020			03/29/2020 13:32	Ping Hua	2168335
	03/27/2020			03/29/2020 13:48	Ping Hua	2168337
	03/27/2020			03/29/2020 14:55	Ping Hua	2168334
EPA 351.2 Rev. 2.0	03/27/2020	03/31/2020 10:05	Sima Feizi	04/01/2020 11:55	Jhamieka S. Greenwood	2168334
	03/27/2020	03/31/2020 10:05	Sima Feizi	04/01/2020 11:57	Jhamieka S. Greenwood	2168335
	03/27/2020	03/31/2020 10:05	Sima Feizi	04/01/2020 12:11	Jhamieka S. Greenwood	2168337
EPA 353.2 Rev. 2.0	03/27/2020			04/02/2020 09:26	Beverly Y. Sanders	2168334
	03/27/2020			04/02/2020 09:27	Beverly Y. Sanders	2168335
	03/27/2020			04/02/2020 09:28	Beverly Y. Sanders	2168337
EPA 365.1 Rev. 2.0	03/27/2020	03/30/2020 17:07	Yen Ta	03/31/2020 13:20	Lipi Saha	2168334
	03/27/2020	03/30/2020 17:07	Yen Ta	03/31/2020 13:21	Lipi Saha	2168335, 2168337
SM 2320 B-2011	03/27/2020			04/01/2020 09:38	Dale L. Simmons	2168332
	03/27/2020			04/01/2020 10:04	Dale L. Simmons	2168333
	03/27/2020			04/01/2020 10:11	Dale L. Simmons	2168336
SM 2340B	03/27/2020			04/08/2020 13:15	Betina Topolski	2168342
	03/27/2020			04/08/2020 14:03	Betina Topolski	2168340
	03/27/2020			04/08/2020 14:08	Betina Topolski	2168341
SM 2540 C-2011	03/27/2020			04/01/2020 16:21	Yijie Li	2168332, 2168333, 2168336
SM 2540 D-2011	03/27/2020			04/01/2020 16:21	Yijie Li	2168332, 2168333, 2168336
SM 4500 F-C-2011	03/27/2020			04/03/2020 20:30	Samantha Davila	2168332
	03/27/2020			04/03/2020 20:35	Samantha Davila	2168333
	03/27/2020			04/03/2020 20:40	Samantha Davila	2168336
SM 5310 B-2011	03/27/2020			03/31/2020 01:59	Madeline Gruver	2168334
	03/27/2020			03/31/2020 02:12	Madeline Gruver	2168335
	03/27/2020			03/31/2020 04:15	Madeline Gruver	2168337