Chemical Analysis Report

NW-DIST-2020-07-24-01

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-2020-07-13-50**
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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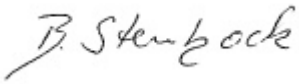
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 12-AUG-2020 17:59



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: 07/23/2020 11:43**

Field ID: G3NW0130 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2185558	EPA 180.1 Rev. 2.0	Turbidity	16		NTU	P385133	
	EPA 300.0 Rev. 2.1	Chloride	4.6		mg Cl/L	P385624	
		Sulfate	2.4		mg SO4/L	P385628	
	SM 2120 B-2011	Color (true)	14	A	PCU	P385138	
	SM 2320 B-2011	Total Alkalinity	49		mg CaCO3/L	P385523	
	SM 2540 C-2011	TDS	64		mg/L	P385614	
	SM 2540 D-2011	TSS	16		mg/L	P385651	
	SM 4500 F-C-2011	Fluoride	0.051	I	mg F/L	P385225	
2185559	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P385152	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.37		mg N/L	P385372	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.40		mg N/L	P385180	
	EPA 365.1 Rev. 2.0	Total-P	0.053		mg P/L	P385351	
	SM 5310 B-2011	Organic Carbon	3.7		mg C/L	P385291	
2185560	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.008	I	mg P/L	P385130	
2185566	EPA 200.7 Rev. 4.4	Barium	27.9		ug/L	P385268	
		Calcium	16.7		mg/L	P385268	
		Iron	1.48E+03		ug/L	P385268	
		Magnesium	2.92		mg/L	P385268	
		Potassium	1.2	I	mg/L	P385268	
		Sodium	3.6		mg/L	P385268	
		Zinc	5.0	U	ug/L	P385268	
	EPA 200.8 Rev. 5.4	Aluminum	460		ug/L	P385268	
		Antimony	0.050	U	ug/L	P385268	
		Arsenic	0.82		ug/L	P385268	
		Boron**	14.0		ug/L	P385268	
		Cadmium	0.020	U	ug/L	P385268	
		Chromium	1.1	I	ug/L	P385268	
		Copper	0.40	U	ug/L	P385268	
		Lead	0.43		ug/L	P385268	
		Nickel	0.52	I	ug/L	P385268	
		Selenium	0.20	U	ug/L	P385268	
		Silver	0.010	U	ug/L	P385268	
		Thallium	0.10	U	ug/L	P385268	
	SM 2340B	Hardness	53.7		mg/L	P385268	

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: 07/23/2020 12:00**

Field ID: FB_07232020 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2185561	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P385133	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P385624	
		Sulfate	0.20	U	mg SO4/L	P385628	
	SM 2120 B-2011	Color (true)	2.5	U	PCU	P385136	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P385523	
	SM 2540 C-2011	TDS	15	U	mg/L	P385613	
	SM 2540 D-2011	TSS	2	U	mg/L	P385650	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P385225	
2185562	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P385152	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P385259	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P385180	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P385351	
	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P385291	
2185563	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P385131	
2185567	EPA 200.7 Rev. 4.4	Barium	1.0	U	ug/L	P385268	
		Calcium	0.075	U	mg/L	P385268	
		Iron	30	U	ug/L	P385268	
		Magnesium	0.040	U	mg/L	P385268	
		Potassium	0.30	U	mg/L	P385268	
		Sodium	0.50	U	mg/L	P385268	
		Zinc	5.0	U	ug/L	P385268	
	EPA 200.8 Rev. 5.4	Aluminum	5.0	U	ug/L	P385268	
		Antimony	0.050	U	ug/L	P385268	
		Arsenic	0.050	U	ug/L	P385268	
		Boron**	2.0	U	ug/L	P385268	
		Cadmium	0.020	U	ug/L	P385268	
		Chromium	0.40	U	ug/L	P385268	
		Copper	0.43	I	ug/L	P385268	
		Lead	0.20	U	ug/L	P385268	
		Nickel	0.50	U	ug/L	P385268	
		Selenium	0.20	U	ug/L	P385268	
		Silver	0.010	U	ug/L	P385268	
		Thallium	0.10	U	ug/L	P385268	
	SM 2340B	Hardness	0.35	U	mg/L	P385268	

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 copper result was confirmed in the undigested sample on 08/06/2020.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P385133

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P385268

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: P385268

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P385624

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P385628

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385152

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: P385259

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385372

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385180

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385351

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385130

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385131

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

Reference Method: SM 2120 B-2011
Batch ID: P385136

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B-2011
Batch ID: P385138

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P385523

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P385613

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-2011
Batch ID: P385614

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P385650

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P385651

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P385225

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P385291

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: P385268

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	101		P	85 - 115
Iron	106		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	102		P	85 - 115
Sodium	102		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P385268

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	96.3		P	85 - 115
Antimony	99.1		P	85 - 115
Arsenic	97.8		P	85 - 115
Boron	102		P	85 - 115
Cadmium	96.2		P	85 - 115
Chromium	96.6		P	85 - 115
Copper	100		P	85 - 115
Lead	101		P	85 - 115
Nickel	97.9		P	85 - 115
Selenium	95.0		P	85 - 115
Silver	109		P	85 - 115
Thallium	99.4		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P385624

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P385628

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385152

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385259

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385372

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385180

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: P385351

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385130

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385131

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.7		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P385136

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

Reference Method: SM 2120 B-2011
Batch ID: P385138

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

Reference Method: SM 2320 B-2011
Batch ID: P385523

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

Reference Method: SM 4500 F-C-2011
Batch ID: P385225

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.7		P	90 - 106

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P385291

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P385268

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185215	Barium	107	106	P/P	80 - 120
2185215	Calcium	102		P	80 - 120
2185215	Iron	104	107	P/P	80 - 120
2185215	Magnesium	104		P	80 - 120
2185215	Potassium	102	107	P/P	80 - 120
2185215	Sodium	103		P	80 - 120
2185215	Zinc	108	106	P/P	80 - 120
2185566	Barium	106		P	80 - 120
2185566	Calcium	101		P	80 - 120
2185566	Iron	107		P	80 - 120
2185566	Magnesium	110		P	80 - 120
2185566	Potassium	107		P	80 - 120
2185566	Sodium	106		P	80 - 120
2185566	Zinc	106		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P385268

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185215	Aluminum	95.5	93.9	P/P	80 - 120
2185215	Antimony	101	100	P/P	80 - 120
2185215	Arsenic	100	98.7	P/P	80 - 120
2185215	Boron	106	105	P/P	80 - 120
2185215	Cadmium	97.8	96.4	P/P	80 - 120
2185215	Chromium	101	99.6	P/P	80 - 120
2185215	Copper	99.9	98.6	P/P	80 - 120
2185215	Lead	103	102	P/P	80 - 120
2185215	Nickel	96.8	96.0	P/P	80 - 120
2185215	Selenium	94.2	92.8	P/P	80 - 120
2185215	Silver	106	107	P/P	80 - 120
2185215	Thallium	103	104	P/P	80 - 120
2185566	Aluminum	94.9		P	80 - 120
2185566	Antimony	94.8		P	80 - 120
2185566	Arsenic	96.1		P	80 - 120
2185566	Boron	106		P	80 - 120
2185566	Cadmium	97.1		P	80 - 120
2185566	Chromium	101		P	80 - 120
2185566	Copper	100		P	80 - 120
2185566	Lead	101		P	80 - 120
2185566	Nickel	95.2		P	80 - 120
2185566	Selenium	88.8		P	80 - 120
2185566	Silver	109		P	80 - 120
2185566	Thallium	101		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P385624

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185455	Chloride	101		P	90 - 110
2185482	Chloride	101		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P385628

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185455	Sulfate	103		P	90 - 110
2185482	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385152

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185559	Ammonia-N	96.8	96.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385259

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185602	Kjeldahl Nitrogen	108	114	P/F	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385372

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185286	Kjeldahl Nitrogen	109	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385180

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185602	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385351

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185489	Total-P	110	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385130

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185457	O-Phosphate-P	90.9	91.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385131

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185603	O-Phosphate-P	96.6	96.2	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P385225

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185606	Fluoride	105	106	P/P	94 - 107

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P385291

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185559	Organic Carbon	101	101	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P385133

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185460	Turbidity	5.73	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P385268

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185215	Barium	0.412	Spike	P	0 - 20
2185215	Calcium	1.50	Spike	P	0 - 20
2185215	Iron	2.50	Spike	P	0 - 20
2185215	Magnesium	2.10	Spike	P	0 - 20
2185215	Potassium	3.06	Spike	P	0 - 20
2185215	Sodium	1.97	Spike	P	0 - 20
2185215	Zinc	1.41	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P385268

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185215	Aluminum	1.65	Spike	P	0 - 20
2185215	Antimony	0.698	Spike	P	0 - 20
2185215	Arsenic	1.25	Spike	P	0 - 20
2185215	Boron	0.864	Spike	P	0 - 20
2185215	Cadmium	1.47	Spike	P	0 - 20
2185215	Chromium	1.54	Spike	P	0 - 20
2185215	Copper	1.21	Spike	P	0 - 20
2185215	Lead	0.361	Spike	P	0 - 20
2185215	Nickel	0.833	Spike	P	0 - 20
2185215	Selenium	1.47	Spike	P	0 - 20
2185215	Silver	0.900	Spike	P	0 - 20
2185215	Thallium	0.526	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P385624

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185482	Chloride	0.374	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P385628

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185482	Sulfate	0.795	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385152

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185559	Ammonia-N	0.0	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385259

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185602	Kjeldahl Nitrogen	2.93	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385372

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185286	Kjeldahl Nitrogen	3.39	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385180

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185602	NO2NO3-N	0.499	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385351

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185489	Total-P	1.52	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385130

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185457	O-Phosphate-P	0.439	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385131

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185603	O-Phosphate-P	0.392	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P385136

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185455	Color (true)	2.92	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2120 B-2011
Batch ID: P385138

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185558	Color (true)	1.67	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P385523

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2186718	Total Alkalinity	0.594	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P385613

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185460	TDS	2.96	Sample	P	0 - 10

Reference Method: SM 2540 C-2011
Batch ID: P385614

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185488	TDS	4.47	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P385225

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185606	Fluoride	0.988	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P385291

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185559	Organic Carbon	0.0837	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: A100070
Included Lab Sample IDs: 2185560, 2185563

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.9	97.0	P/P	90 - 110
O-Phosphate-P	97.0	96.5	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A100071
Included Lab Sample IDs: 2185558, 2185561

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

Reference Method: SM 2120 B-2011
Run ID: A100072
Included Lab Sample IDs: 2185558, 2185561

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	102	P/P	90 - 115
Color (true)	103	104	P/P	90 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A100074
Included Lab Sample IDs: 2185559, 2185562

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	100	P/P	90 - 110
Ammonia-N	100	99.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A100089
Included Lab Sample IDs: 2185559, 2185562

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

Reference Method: SM 4500 F-C-2011
Run ID: A100116
Included Lab Sample IDs: 2185558, 2185561

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

Reference Method: SM 5310 B-2011
Run ID: A100142
Included Lab Sample IDs: 2185559, 2185562

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A100150
Included Lab Sample IDs: 2185562

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A100158
Included Lab Sample IDs: 2185566, 2185567

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	102	P/P	90 - 110
Barium	103	104	P/P	90 - 110
Calcium	100	99.4	P/P	90 - 110
Calcium	102	101	P/P	90 - 110
Iron	102	101	P/P	90 - 110
Iron	104	103	P/P	90 - 110
Magnesium	102	101	P/P	90 - 110
Magnesium	103	103	P/P	90 - 110
Potassium	101	101	P/P	90 - 110
Potassium	101	98.8	P/P	90 - 110
Sodium	102	102	P/P	90 - 110
Sodium	103	99.8	P/P	90 - 110
Zinc	100	101	P/P	90 - 110
Zinc	102	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A100209
Included Lab Sample IDs: 2185559

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.2	99.8	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A100227
Included Lab Sample IDs: 2185558, 2185561

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.4	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A100252
Included Lab Sample IDs: 2185559, 2185562

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	92.5	92.8	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A100267
Included Lab Sample IDs: 2185558, 2185561

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A100326
Included Lab Sample IDs: 2185566, 2185567

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	94.6	95.1	P/P	90 - 110
Aluminum	96.1	95.3	P/P	90 - 110
Antimony	94.7	94.3	P/P	90 - 110
Antimony	98.5	96.0	P/P	90 - 110
Arsenic	93.5	92.8	P/P	90 - 110
Arsenic	97.7	96.5	P/P	90 - 110
Boron	101	102	P/P	90 - 110
Boron	97.6	95.7	P/P	90 - 110
Cadmium	93.3	93.0	P/P	90 - 110
Cadmium	95.6	93.6	P/P	90 - 110
Chromium	95.4	94.6	P/P	90 - 110
Chromium	95.7	93.9	P/P	90 - 110
Copper	96.3	95.0	P/P	90 - 110
Copper	99.0	98.0	P/P	90 - 110
Lead	95.6	95.7	P/P	90 - 110
Lead	97.3	96.8	P/P	90 - 110
Nickel	95.6	94.6	P/P	90 - 110
Selenium	92.5	91.4	P/P	90 - 110
Selenium	94.8	94.4	P/P	90 - 110
Silver	104	103	P/P	90 - 110
Silver	106	104	P/P	90 - 110
Thallium	94.8	93.6	P/P	90 - 110
Thallium	96.5	95.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A100356
Included Lab Sample IDs: 2185567

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	104	101	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						5.73	
EPA 200.7 Rev. 4.4	Barium	102	107	106	106			0.412
	Calcium	101	102	101				1.50
	Iron	106	104	107	107			2.50
	Magnesium	102	104	110				2.10
	Potassium	102	102	107	107			3.06
	Sodium	102	103	106				1.97
	Zinc	103	108	106	106			1.41
EPA 200.8 Rev. 5.4	Aluminum	96.3	95.5	93.9	94.9			1.65
	Antimony	99.1	101	100	94.8			0.698
	Arsenic	97.8	100	98.7	96.1			1.25
	Boron	102	106	105	106			0.864
	Cadmium	96.2	97.8	96.4	97.1			1.47
	Chromium	96.6	101	99.6	101			1.54
	Copper	100	99.9	98.6	100			1.21
	Lead	101	103	102	101			0.361
	Nickel	97.9	96.8	96.0	95.2			0.833
	Selenium	95.0	94.2	92.8	88.8			1.47
	Silver	109	106	107	109			0.900
	Thallium	99.4	103	104	101			0.526
EPA 300.0 Rev. 2.1	Chloride	102	101	101			0.374	
	Sulfate	103	101	103			0.795	
EPA 350.1 Rev. 2.0	Ammonia-N	98.4	96.8	96.8				0.0
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	108	114				2.93
	Kjeldahl Nitrogen	101	109	105				3.39
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100	100				0.499
EPA 365.1 Rev. 2.0	Total-P	105	110	108				1.52
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	90.9	91.3				0.439
	O-Phosphate-P	98.7	96.6	96.2				0.392
SM 2120 B-2011	Color (true)	102					2.92	
	Color (true)	103					1.67	
SM 2320 B-2011	Total Alkalinity	101					0.594	
SM 2540 C-2011	TDS						2.96	
	TDS						4.47	
SM 4500 F-C-2011	Fluoride	97.7	105	106				0.988
SM 5310 B-2011	Organic Carbon	101	101	101				0.0837

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2185558, 2185561
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2185566, 2185567
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2185566, 2185567
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2185558, 2185561
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2185558, 2185561
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2185559, 2185562
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2185559, 2185562
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2185559, 2185562
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2185559, 2185562
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2185560, 2185563

Reference Method Descriptions

Method	Description	Associated Samples
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2185558, 2185561
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2185558, 2185561
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2185566, 2185567
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2185558, 2185561
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2185558, 2185561
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2185558, 2185561
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2185559, 2185562

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	07/24/2020			07/24/2020 15:04	Samantha Davila	2185558, 2185561
EPA 200.7 Rev. 4.4	07/24/2020	07/28/2020 15:30	Elliott D. Healy	07/29/2020 15:37	Betina Topolski	2185567
	07/24/2020	07/28/2020 15:30	Elliott D. Healy	07/29/2020 18:52	Betina Topolski	2185566
EPA 200.8 Rev. 5.4	07/24/2020	07/28/2020 15:30	Elliott D. Healy	08/06/2020 14:00	Alexander Thompson	2185567
	07/24/2020	07/28/2020 15:30	Elliott D. Healy	08/06/2020 17:24	Alexander Thompson	2185566
	07/24/2020	07/28/2020 15:30	Elliott D. Healy	08/07/2020 17:44	Alexander Thompson	2185567
EPA 300.0 Rev. 2.1	07/24/2020			08/01/2020 00:40	Julia Storbeck	2185558
	07/24/2020			08/01/2020 00:52	Julia Storbeck	2185561
EPA 350.1 Rev. 2.0	07/24/2020			07/26/2020 13:37	Ping Hua	2185559
	07/24/2020			07/26/2020 13:49	Ping Hua	2185562
EPA 351.2 Rev. 2.0	07/24/2020	07/28/2020 11:40	Jhamieka S. Greenwood	07/29/2020 13:08	Jhamieka S. Greenwood	2185562
	07/24/2020	07/30/2020 12:15	Jhamieka S. Greenwood	07/31/2020 14:05	Jhamieka S. Greenwood	2185559
EPA 353.2 Rev. 2.0	07/24/2020			07/27/2020 08:58	Beverly Y. Sanders	2185559
	07/24/2020			07/27/2020 09:03	Beverly Y. Sanders	2185562
EPA 365.1 Rev. 2.0	07/24/2020	07/30/2020 11:20	Lipi Saha	08/04/2020 11:47	Benjamin T. Nordmann	2185559
	07/24/2020	07/30/2020 11:20	Lipi Saha	08/04/2020 11:48	Benjamin T. Nordmann	2185562
EPA 365.1 Rev. 2.0 dissolved	07/24/2020			07/24/2020 15:30	Carlos Miranda	2185560
	07/24/2020			07/24/2020 15:43	Carlos Miranda	2185563
SM 2120 B-2011	07/24/2020			07/24/2020 15:43	Blanca Fach	2185561
	07/24/2020			07/24/2020 15:59	Blanca Fach	2185558
SM 2320 B-2011	07/24/2020			08/01/2020 08:10	Dale L. Simmons	2185558
	07/24/2020			08/01/2020 08:17	Dale L. Simmons	2185561
SM 2340B	07/24/2020			07/29/2020 15:37	Betina Topolski	2185567
	07/24/2020			07/29/2020 18:52	Betina Topolski	2185566
SM 2540 C-2011	07/24/2020			07/29/2020 15:16	Yijie Li	2185558, 2185561
SM 2540 D-2011	07/24/2020			07/29/2020 15:16	Yijie Li	2185558, 2185561
SM 4500 F-C-2011	07/24/2020			07/27/2020 19:56	Lauren Lees	2185558
	07/24/2020			07/27/2020 20:05	Lauren Lees	2185561
SM 5310 B-2011	07/24/2020			07/28/2020 23:24	David Boose	2185559
	07/24/2020			07/29/2020 00:50	David Boose	2185562