Chemical Analysis Report

NW-DIST-2021-05-07-01

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

Event Description: **North Escambia County Run**
Request ID: **RQ-2021-05-03-61**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 Government Center
Suite 208
Pensacola, FL 32502-5794
Attn: Cheryl Bunch

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, Environmental Consultant Date Certified: 27-MAY-2021 13:23

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: Little Pine Barren Creek below CR99A **Collection Date/Time: 05/06/2021 11:20**

Field ID: G4NW0192 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2246145	EPA 200.7 Rev. 4.4	Barium	38.9		ug/L	P398257	
		Calcium	2.84		mg/L	P398257	
		Iron	2.36E+03		ug/L	P398257	
		Magnesium	1.66		mg/L	P398257	
		Manganese	52.7		ug/L	P398257	
		Potassium	3.4		mg/L	P398257	
		Sodium	1.9	I	mg/L	P398257	
		Zinc	5.0	U	ug/L	P398257	
	EPA 200.8 Rev. 5.4	Aluminum	577		ug/L	P398257	
		Antimony	0.050	U	ug/L	P398257	
		Arsenic	0.87		ug/L	P398257	
		Beryllium	0.030	I	ug/L	P398257	
		Boron**	14.3		ug/L	P398257	
		Cadmium	0.020	U	ug/L	P398257	
		Chromium	0.51	I	ug/L	P398257	
		Copper	0.66	I	ug/L	P398257	
		Lead	0.38	I	ug/L	P398257	
		Nickel	0.50	U	ug/L	P398257	
		Selenium	0.20	U	ug/L	P398257	
		Silver	0.010	U	ug/L	P398257	
		Thallium	0.10	U	ug/L	P398257	
	SM 2340B	Hardness	13.9		mg/L	P398257	

Sample Location: Big Escambia Creek downstream of Fannie Rd **Collection Date/Time: 05/06/2021 10:20**

Field ID: G4NW0421 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2246132	EPA 180.1 Rev. 2.0	Turbidity	15	A	NTU	P397845	
	EPA 300.0 Rev. 2.1	Chloride	3.5		mg Cl/L	P398645	
		Sulfate	1.1		mg SO4/L	P398648	
	SM 2120 B-2011	Color (true)	49	A	PCU	P397843	
	SM 2320 B-2011	Total Alkalinity	2.6		mg CaCO3/L	P398273	
	SM 2540 C-2011	TDS	27		mg/L	P398301	
	SM 2540 D-2011	TSS	16		mg/L	P398296	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P398696	
2246133	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P398304	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.38		mg N/L	P398168	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.18		mg N/L	P397887	
	EPA 365.1 Rev. 2.0	Total-P	0.033		mg P/L	P398213	
	SM 5310 B-2011	Organic Carbon	7.3		mg C/L	P398165	
2246134	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P397830	

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: Wiggins Branch below Highway 29 **Collection Date/Time: 05/06/2021 10:00**

Field ID: G4NW0163 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2246144	EPA 200.7 Rev. 4.4	Barium	12.0		ug/L	P398257	
		Calcium	1.97		mg/L	P398257	
		Iron	680		ug/L	P398257	
		Magnesium	0.78		mg/L	P398257	
		Manganese	24.0		ug/L	P398257	
		Potassium	0.31	I	mg/L	P398257	
		Sodium	1.7	I	mg/L	P398257	
		Zinc	5.0	U	ug/L	P398257	
	EPA 200.8 Rev. 5.4	Aluminum	119		ug/L	P398257	
		Antimony	0.055	I	ug/L	P398257	
		Arsenic	0.37		ug/L	P398257	
		Beryllium	0.044		ug/L	P398257	
		Boron**	11.3		ug/L	P398257	
		Cadmium	0.020	U	ug/L	P398257	
		Chromium	0.40	U	ug/L	P398257	
		Copper	0.40	U	ug/L	P398257	
		Lead	0.20	U	ug/L	P398257	
		Nickel	0.50	U	ug/L	P398257	
		Selenium	0.20	U	ug/L	P398257	
		Silver	0.010	U	ug/L	P398257	
		Thallium	0.10	U	ug/L	P398257	
	SM 2340B	Hardness	8.1		mg/L	P398257	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P397845

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P398257

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Manganese	1.0	U	ug/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P398257

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: P398645

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P398648

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P398304

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: P398168

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P397887

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398213

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P397830

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

Reference Method: SM 2120 B-2011
Batch ID: P397843

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P398273

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

Reference Method: SM 2540 C-2011
Batch ID: P398301

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P398296

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P398696

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P398165

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: P398257

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	106		P	85 - 115
Iron	102		P	85 - 115
Magnesium	102		P	85 - 115
Manganese	104		P	85 - 115
Potassium	97.4		P	85 - 115
Sodium	101		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P398257

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.3		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	98.8		P	85 - 115
Beryllium	93.0		P	85 - 115
Boron	98.6		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	96.9		P	85 - 115
Copper	99.8		P	85 - 115
Lead	90.7		P	85 - 115
Nickel	98.0		P	85 - 115
Selenium	95.5		P	85 - 115
Silver	99.7		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P398645

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P398648

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P398304

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398168

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.1		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P397887

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: P398213

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: P397830

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

Reference Method: SM 2120 B-2011
Batch ID: P397843

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

Reference Method: SM 2320 B-2011
Batch ID: P398273

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.0		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P398696

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.2		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P398165

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.7		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P398257

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2245897	Barium	101		P	80 - 120
2245897	Calcium	103		P	80 - 120
2245897	Iron	105		P	80 - 120
2245897	Magnesium	105		P	80 - 120
2245897	Manganese	104		P	80 - 120
2245897	Potassium	98.3		P	80 - 120
2245897	Sodium	101		P	80 - 120
2245897	Zinc	103		P	80 - 120
2245949	Barium	101	106	P/P	80 - 120
2245949	Calcium	106	109	P/P	80 - 120
2245949	Iron	104	108	P/P	80 - 120
2245949	Magnesium	103	107	P/P	80 - 120
2245949	Manganese	103	107	P/P	80 - 120
2245949	Potassium	97.3	102	P/P	80 - 120
2245949	Sodium	100	105	P/P	80 - 120
2245949	Zinc	100	104	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P398257

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2245897	Aluminum	95.8		P	80 - 120
2245897	Antimony	101		P	80 - 120
2245897	Arsenic	97.3		P	80 - 120
2245897	Beryllium	89.8		P	80 - 120
2245897	Boron	96.3		P	80 - 120
2245897	Cadmium	101		P	80 - 120
2245897	Chromium	96.1		P	80 - 120
2245897	Copper	99.9		P	80 - 120
2245897	Lead	89.3		P	80 - 120
2245897	Nickel	95.7		P	80 - 120
2245897	Selenium	91.7		P	80 - 120
2245897	Silver	99.2		P	80 - 120
2245897	Thallium	102		P	80 - 120
2245949	Aluminum	97.2	97.0	P/P	80 - 120
2245949	Antimony	100	99.6	P/P	80 - 120
2245949	Arsenic	97.1	97.7	P/P	80 - 120
2245949	Beryllium	87.4	86.5	P/P	80 - 120
2245949	Boron	98.2	97.6	P/P	80 - 120
2245949	Cadmium	102	102	P/P	80 - 120
2245949	Chromium	95.5	95.9	P/P	80 - 120
2245949	Copper	100	101	P/P	80 - 120
2245949	Lead	90.0	89.8	P/P	80 - 120
2245949	Nickel	96.4	97.6	P/P	80 - 120
2245949	Selenium	95.5	95.2	P/P	80 - 120
2245949	Silver	97.2	93.8	P/P	80 - 120
2245949	Thallium	101	101	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P398645

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P398645

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2246132	Chloride	102		P	90 - 110
2246271	Chloride	99.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P398648

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2246132	Sulfate	101		P	90 - 110
2246271	Sulfate	99.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P398304

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2246130	Ammonia-N	99.4	98.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398168

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2246133	Kjeldahl Nitrogen	98.0	96.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P397887

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2246130	NO2NO3-N	98.0	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398213

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2246130	Total-P	106	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P397830

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2246134	O-Phosphate-P	103	102	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P398696

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2246089	Fluoride	97.2	98.5	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P398165

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2245909	Organic Carbon	97.7	97.0	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P397845

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246132	Turbidity	0.647	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P398257

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2245949	Barium	3.84	Spike	P	0 - 20
2245949	Calcium	2.87	Spike	P	0 - 20
2245949	Iron	3.30	Spike	P	0 - 20
2245949	Magnesium	3.60	Spike	P	0 - 20
2245949	Manganese	3.53	Spike	P	0 - 20
2245949	Potassium	3.59	Spike	P	0 - 20
2245949	Sodium	2.56	Spike	P	0 - 20
2245949	Zinc	3.83	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P398257

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2245949	Aluminum	0.157	Spike	P	0 - 20
2245949	Antimony	0.474	Spike	P	0 - 20
2245949	Arsenic	0.654	Spike	P	0 - 20
2245949	Beryllium	0.742	Spike	P	0 - 20
2245949	Boron	0.593	Spike	P	0 - 20
2245949	Cadmium	0.401	Spike	P	0 - 20
2245949	Chromium	0.469	Spike	P	0 - 20
2245949	Copper	0.187	Spike	P	0 - 20
2245949	Lead	0.169	Spike	P	0 - 20
2245949	Nickel	1.10	Spike	P	0 - 20
2245949	Selenium	0.254	Spike	P	0 - 20
2245949	Silver	3.54	Spike	P	0 - 20
2245949	Thallium	0.500	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P398645

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246271	Chloride	0.324	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P398648

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246271	Sulfate	1.21	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P398304

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246130	Ammonia-N	1.23	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398168

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246133	Kjeldahl Nitrogen	1.25	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P397887

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246130	NO2NO3-N	0.512	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398213

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246130	Total-P	0.955	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P397830

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246134	O-Phosphate-P	1.46	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P397843

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246132	Color (true)	4.71	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P398273

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2245659	Total Alkalinity	0.454	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P398301

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246126	TDS	4.30	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P398696

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246089	Fluoride	0.934	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P398165

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2245909	Organic Carbon	0.586	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: A105253
Included Lab Sample IDs: 2246134

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

Reference Method: SM 2120 B-2011
Run ID: A105256
Included Lab Sample IDs: 2246132

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A105258
Included Lab Sample IDs: 2246132

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.0	98.5	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A105281
Included Lab Sample IDs: 2246133

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	99.0	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A105417
Included Lab Sample IDs: 2246133

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.4	97.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A105442
Included Lab Sample IDs: 2246133

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	91.6	94.6	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A105458
Included Lab Sample IDs: 2246132

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	96.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A105464
Included Lab Sample IDs: 2246133

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	99.8	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A105471
Included Lab Sample IDs: 2246133

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A105518
Included Lab Sample IDs: 2246144, 2246145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	103	103	P/P	90 - 110
Antimony	103	105	P/P	90 - 110
Arsenic	101	101	P/P	90 - 110
Beryllium	98.3	99.4	P/P	90 - 110
Boron	103	102	P/P	90 - 110
Cadmium	104	104	P/P	90 - 110
Chromium	99.3	100	P/P	90 - 110
Copper	100	101	P/P	90 - 110
Nickel	100	101	P/P	90 - 110
Silver	99.4	99.6	P/P	90 - 110
Thallium	98.4	98.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A105539
Included Lab Sample IDs: 2246144, 2246145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	102	P/P	90 - 110
Calcium	101	97.3	P/P	90 - 110
Iron	101	96.9	P/P	90 - 110
Magnesium	99.7	96.1	P/P	90 - 110
Manganese	100	100	P/P	90 - 110
Potassium	101	98.1	P/P	90 - 110
Sodium	102	98.9	P/P	90 - 110
Zinc	98.8	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A105541
Included Lab Sample IDs: 2246144, 2246145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	91.5	90.6	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A105550
Included Lab Sample IDs: 2246132

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A105578
Included Lab Sample IDs: 2246144, 2246145

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Selenium	97.1	95.0	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A105626
Included Lab Sample IDs: 2246132

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.6	99.0	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						0.647	
EPA 200.7 Rev. 4.4	Barium	102	101	101	106			3.84
	Calcium	106	103	106	109			2.87
	Iron	102	105	104	108			3.30
	Magnesium	102	105	103	107			3.60
	Manganese	104	104	103	107			3.53
	Potassium	97.4	98.3	97.3	102			3.59
	Sodium	101	101	100	105			2.56
	Zinc	102	103	100	104			3.83
EPA 200.8 Rev. 5.4	Aluminum	97.3	97.2	97.0	95.8			0.157
	Antimony	101	100	99.6	101			0.474
	Arsenic	98.8	97.1	97.7	97.3			0.654
	Beryllium	93.0	87.4	86.5	89.8			0.742
	Boron	98.6	98.2	97.6	96.3			0.593
	Cadmium	101	102	102	101			0.401
	Chromium	96.9	95.5	95.9	96.1			0.469
	Copper	99.8	100	101	99.9			0.187
	Lead	90.7	90.0	89.8	89.3			0.169
	Nickel	98.0	96.4	97.6	95.7			1.10
	Selenium	95.5	95.5	95.2	91.7			0.254
	Silver	99.7	97.2	93.8	99.2			3.54
	Thallium	103	101	101	102			0.500
EPA 300.0 Rev. 2.1	Chloride	102	99.9	102			0.324	
	Sulfate	101	99.3	101			1.21	
EPA 350.1 Rev. 2.0	Ammonia-N	99.2	99.4	98.0				1.23
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.1	98.0	96.4				1.25
EPA 353.2 Rev. 2.0	NO2NO3-N	100	98.0	97.5				0.512
EPA 365.1 Rev. 2.0	Total-P	106	106	108				0.955
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	103	102				1.46
SM 2120 B-2011	Color (true)	103					4.71	
SM 2320 B-2011	Total Alkalinity	99.0					0.454	
SM 2540 C-2011	TDS						4.30	
SM 4500 F-C-2011	Fluoride	94.2	97.2	98.5				0.934
SM 5310 B-2011	Organic Carbon	95.7	97.7	97.0				0.586

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2246132
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2246144, 2246145
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2246144, 2246145
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2246132
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2246132
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2246133
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2246133
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2246133
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2246133
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2246134
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2246132
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2246132

Reference Method Descriptions

Method	Description	Associated Samples
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2246144, 2246145
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2246132
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2246132
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2246132
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2246133

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	05/07/2021			05/07/2021 15:26	Yen Ta	2246132
EPA 200.7 Rev. 4.4	05/07/2021	05/17/2021 14:45	Elliott D. Healy	05/19/2021 15:44	Betina Topolski	2246144
	05/07/2021	05/17/2021 14:45	Elliott D. Healy	05/19/2021 15:50	Betina Topolski	2246145
EPA 200.8 Rev. 5.4	05/07/2021	05/17/2021 14:45	Elliott D. Healy	05/18/2021 20:16	McKinley C Carter	2246144
	05/07/2021	05/17/2021 14:45	Elliott D. Healy	05/18/2021 20:24	McKinley C Carter	2246145
	05/07/2021	05/17/2021 14:45	Elliott D. Healy	05/19/2021 19:45	Alexander Thompson	2246144
	05/07/2021	05/17/2021 14:45	Elliott D. Healy	05/19/2021 19:52	Alexander Thompson	2246145
	05/07/2021	05/17/2021 14:45	Elliott D. Healy	05/20/2021 19:21	Alexander Thompson	2246144
	05/07/2021	05/17/2021 14:45	Elliott D. Healy	05/20/2021 19:28	Alexander Thompson	2246145
EPA 300.0 Rev. 2.1	05/07/2021			05/21/2021 15:33	Lipi Saha	2246132
EPA 350.1 Rev. 2.0	05/07/2021			05/17/2021 11:55	Roberta Tatti	2246133
EPA 351.2 Rev. 2.0	05/07/2021	05/13/2021 18:44	Benjamin T. Nordmann	05/14/2021 15:55	Virginia P. Brown	2246133
EPA 353.2 Rev. 2.0	05/07/2021			05/10/2021 10:50	Beverly Y. Sanders	2246133
EPA 365.1 Rev. 2.0	05/07/2021	05/14/2021 13:32	Yen Ta	05/17/2021 14:31	Shengyu Ding	2246133
EPA 365.1 Rev. 2.0 dissolved	05/07/2021			05/07/2021 12:37	Lipi Saha	2246134
SM 2120 B-2011	05/07/2021			05/07/2021 16:01	Sarah A Nixon	2246132
SM 2320 B-2011	05/07/2021			05/14/2021 03:48	Dale L. Simmons	2246132
SM 2340B	05/07/2021			05/19/2021 15:44	Betina Topolski	2246144
	05/07/2021			05/19/2021 15:50	Betina Topolski	2246145
SM 2540 C-2011	05/07/2021			05/11/2021 15:02	Yijie Li	2246132
SM 2540 D-2011	05/07/2021			05/11/2021 15:02	Yijie Li	2246132
SM 4500 F-C-2011	05/07/2021			05/24/2021 17:18	Dale L. Simmons	2246132
SM 5310 B-2011	05/07/2021			05/13/2021 01:22	Madeline Gruver	2246133