

Chemical Analysis Report

NW-DIST-2021-06-02-01

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

Event Description: **Escambia River Run**
Request ID: **RQ-2021-04-19-34**
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

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 25-JUN-2021 10:16

A handwritten signature in black ink, appearing to read "Liang Lin", is shown on a light-colored background.

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Escambia River Upstream of Mitchell Creek

Collection Date/Time: 06/01/2021 10:00

Field ID: G4NW0404

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2251505	EPA 180.1 Rev. 2.0	Turbidity	13	A	NTU	P399118	
	EPA 300.0 Rev. 2.1	Chloride	6.4		mg Cl/L	P399639	
		Sulfate	9.8		mg SO4/L	P399618	
		Color (true)	45	A	PCU	P399114	
	SM 2320 B-2011	Total Alkalinity	38		mg CaCO3/L	P399338	
	SM 2540 C-2011	TDS	85		mg/L	P399524	
	SM 2540 D-2011	TSS	16	A	mg/L	P399316	
	SM 4500 F-C-2011	Fluoride	0.040	I	mg F/L	P399342	
2251507	EPA 350.1 Rev. 2.0	Ammonia-N	0.078		mg N/L	P399412	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.36		mg N/L	P399227	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.37		mg N/L	P399216	
	EPA 365.1 Rev. 2.0	Total-P	0.050		mg P/L	P399488	
	SM 5310 B-2011	Organic Carbon	3.6		mg C/L	P399729	
2251509	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P399120	
2251513	EPA 200.7 Rev. 4.4	Barium	29.7		ug/L	P399302	
		Iron	1.61E+03		ug/L	P399302	
		Magnesium	1.48		mg/L	P399302	
		Manganese	66.9		ug/L	P399302	
		Potassium	1.1	I	mg/L	P399302	
		Sodium	10.6		mg/L	P399302	
	EPA 200.8 Rev. 5.4	Zinc	6.2	I	ug/L	P399302	
		Aluminum	412		ug/L	P399302	
		Antimony	0.050	U	ug/L	P399302	
		Arsenic	0.80		ug/L	P399302	
		Beryllium	0.062		ug/L	P399302	
		Boron**	11.0		ug/L	P399302	
		Cadmium	0.020	U	ug/L	P399302	
		Chromium	1.1	I	ug/L	P399302	
		Copper	0.40	U	ug/L	P399302	
		Lead	0.52		ug/L	P399302	
		Nickel	0.76	I	ug/L	P399302	
		Selenium	0.20	U	ug/L	P399302	
		Silver	0.010	U	ug/L	P399302	
		Thallium	0.10	U	ug/L	P399302	
		Hardness	41.9		mg/L	P399302	
	SM 2340B						

Sample Location: Escambia River Downstream of Cotton Lake

Collection Date/Time: 06/01/2021 10:45

Field ID: G4NW0403

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2251506	EPA 180.1 Rev. 2.0	Turbidity	14		NTU	P399118	
	EPA 300.0 Rev. 2.1	Chloride	6.3		mg Cl/L	P399639	
		Sulfate	9.2		mg SO4/L	P399618	
		Color (true)	43		PCU	P399114	
	SM 2120 B-2011	Total Alkalinity	37		mg CaCO3/L	P399338	
	SM 2540 C-2011	TDS	72		mg/L	P399524	
	SM 2540 D-2011	TSS	15	A	mg/L	P399317	
	SM 4500 F-C-2011	Fluoride	0.039	I	mg F/L	P399342	
2251508	EPA 350.1 Rev. 2.0	Ammonia-N	0.047		mg N/L	P399412	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.36		mg N/L	P399227	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.38		mg N/L	P399216	
	EPA 365.1 Rev. 2.0	Total-P	0.048		mg P/L	P399488	
	SM 5310 B-2011	Organic Carbon	3.6		mg C/L	P399729	
2251510	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.015		mg P/L	P399120	
2251514	EPA 200.7 Rev. 4.4	Barium	29.8		ug/L	P399302	
		Iron	1.53E+03		ug/L	P399302	
		Magnesium	1.45		mg/L	P399302	
		Manganese	77.5		ug/L	P399302	
		Potassium	1.1	I	mg/L	P399302	
		Sodium	9.8		mg/L	P399302	
		Zinc	6.5	I	ug/L	P399302	
	EPA 200.8 Rev. 5.4	Aluminum	469		ug/L	P399302	
		Antimony	0.050	U	ug/L	P399302	
		Arsenic	0.78		ug/L	P399302	
		Beryllium	0.065		ug/L	P399302	
		Boron**	11.3		ug/L	P399302	
		Cadmium	0.020	U	ug/L	P399302	
		Chromium	1.1	I	ug/L	P399302	
		Copper	0.40	U	ug/L	P399302	
		Lead	0.54		ug/L	P399302	
		Nickel	0.74	I	ug/L	P399302	
		Selenium	0.20	U	ug/L	P399302	
		Silver	0.010	U	ug/L	P399302	
		Thallium	0.10	U	ug/L	P399302	
		Hardness	40.9		mg/L	P399302	
	SM 2340B						

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P399118

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P399302

Component	Result	Code	Units
Barium	1.0	U	ug/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: P399302

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: P399618

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399639

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399412

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: P399227

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399216

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399488

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399120

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

Reference Method: SM 2120 B-2011
Batch ID: P399114

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P399338

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

Reference Method: SM 2540 C-2011
Batch ID: P399524

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P399316

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P399317

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P399342

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P399729

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: P399302

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	98.0		P	85 - 115
Iron	106		P	85 - 115
Magnesium	105		P	85 - 115
Manganese	99.7		P	85 - 115
Potassium	101		P	85 - 115
Sodium	104		P	85 - 115
Zinc	93.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P399302

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.4		P	85 - 115
Antimony	102		P	85 - 115
Arsenic	102		P	85 - 115
Beryllium	92.4		P	85 - 115
Boron	107		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	99.7		P	85 - 115
Copper	100		P	85 - 115
Lead	110		P	85 - 115
Nickel	99.6		P	85 - 115
Selenium	103		P	85 - 115
Silver	101		P	85 - 115
Thallium	104		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399618

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399639

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P399412

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

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P399227

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399216

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: P399488

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399120

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

Reference Method: SM 2120 B-2011
Batch ID: P399114

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	100		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P399338

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.1		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P399342

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.5		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P399729

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P399302

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251062	Barium	99.4		P	80 - 120
2251062	Iron	106		P	80 - 120
2251062	Magnesium	102		P	80 - 120
2251062	Manganese	101		P	80 - 120
2251062	Potassium	98.3		P	80 - 120
2251062	Sodium	103		P	80 - 120
2251062	Zinc	98.0		P	80 - 120
2251291	Barium	102	100	P/P	80 - 120
2251291	Iron	110	107	P/P	80 - 120
2251291	Magnesium	109	106	P/P	80 - 120
2251291	Manganese	103	101	P/P	80 - 120
2251291	Potassium	105	102	P/P	80 - 120
2251291	Sodium	110	106	P/P	80 - 120
2251291	Zinc	99.0	97.7	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P399302

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251062	Aluminum	98.1		P	80 - 120
2251062	Antimony	104		P	80 - 120
2251062	Arsenic	103		P	80 - 120
2251062	Beryllium	95.5		P	80 - 120
2251062	Boron	101		P	80 - 120
2251062	Cadmium	104		P	80 - 120
2251062	Chromium	101		P	80 - 120
2251062	Copper	102		P	80 - 120
2251062	Lead	111		P	80 - 120
2251062	Nickel	101		P	80 - 120
2251062	Selenium	103		P	80 - 120
2251062	Silver	101		P	80 - 120
2251062	Thallium	107		P	80 - 120
2251291	Aluminum	93.7	96.8	P/P	80 - 120
2251291	Antimony	99.7	101	P/P	80 - 120
2251291	Arsenic	99.5	102	P/P	80 - 120
2251291	Beryllium	89.3	94.0	P/P	80 - 120
2251291	Boron	97.3	98.0	P/P	80 - 120
2251291	Cadmium	102	103	P/P	80 - 120
2251291	Chromium	97.6	98.5	P/P	80 - 120
2251291	Copper	98.9	99.5	P/P	80 - 120
2251291	Lead	108	110	P/P	80 - 120
2251291	Nickel	97.3	97.7	P/P	80 - 120
2251291	Selenium	98.2	99.4	P/P	80 - 120
2251291	Silver	103	102	P/P	80 - 120
2251291	Thallium	102	104	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399618

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251099	Sulfate	93.6		P	90 - 110
2251452	Sulfate	96.3		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P399639

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251099	Chloride	92.4		P	90 - 110
2251452	Chloride	95.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399412

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251420	Ammonia-N	99.6	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399227

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251286	Kjeldahl Nitrogen	103	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399216

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251286	NO2NO3-N	100	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399488

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251301	Total-P	104	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399120

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251421	O-Phosphate-P	99.0	97.8	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P399342

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2251710	Fluoride	98.8	98.8	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P399729

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2250478	Organic Carbon	94.6	95.5	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P399118

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251505	Turbidity	3.05	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P399302

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251291	Barium	1.50	Spike	P	0 - 20
2251291	Iron	2.15	Spike	P	0 - 20
2251291	Magnesium	2.21	Spike	P	0 - 20
2251291	Manganese	1.68	Spike	P	0 - 20
2251291	Potassium	2.85	Spike	P	0 - 20
2251291	Sodium	2.89	Spike	P	0 - 20
2251291	Zinc	1.32	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P399302

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251291	Aluminum	3.19	Spike	P	0 - 20
2251291	Antimony	0.851	Spike	P	0 - 20
2251291	Arsenic	2.07	Spike	P	0 - 20
2251291	Beryllium	5.13	Spike	P	0 - 20
2251291	Boron	0.664	Spike	P	0 - 20
2251291	Cadmium	0.698	Spike	P	0 - 20
2251291	Chromium	0.968	Spike	P	0 - 20
2251291	Copper	0.543	Spike	P	0 - 20
2251291	Lead	2.05	Spike	P	0 - 20
2251291	Nickel	0.352	Spike	P	0 - 20
2251291	Selenium	1.20	Spike	P	0 - 20
2251291	Silver	1.13	Spike	P	0 - 20
2251291	Thallium	2.85	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399618

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251099	Sulfate	1.08	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P399639

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251099	Chloride	0.714	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399412

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251420	Ammonia-N	0.184	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399227

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251286	Kjeldahl Nitrogen	0.957	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399216

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251286	NO2NO3-N	1.97	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399488

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251301	Total-P	0.989	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399120

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251421	O-Phosphate-P	1.22	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P399114

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251505	Color (true)	0.00447	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P399338

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251710	Total Alkalinity	1.18	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P399524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251306	TDS	4.13	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 2540 D-2011
Batch ID: P399316

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251505	TSS	2.53	Sample	P	0 - 10

Reference Method: SM 2540 D-2011
Batch ID: P399317

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251506	TSS	5.41	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P399342

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2251710	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P399729

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2250478	Organic Carbon	0.812	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: SM 2120 B-2011

Run ID: A105824

Included Lab Sample IDs: 2251505, 2251506

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.9	100	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A105825

Included Lab Sample IDs: 2251505, 2251506

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	99.0	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A105826

Included Lab Sample IDs: 2251509, 2251510

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A105874

Included Lab Sample IDs: 2251507, 2251508

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A105917

Included Lab Sample IDs: 2251507, 2251508

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	99.9	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A105930

Included Lab Sample IDs: 2251505, 2251506

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.8	98.7	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A105930

Included Lab Sample IDs: 2251505, 2251506

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A105953

Included Lab Sample IDs: 2251513, 2251514

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	100	P/P	90 - 110
Iron	98.7	96.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A105953

Included Lab Sample IDs: 2251513, 2251514

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Magnesium	97.4	94.9	P/P	90 - 110
Manganese	101	101	P/P	90 - 110
Potassium	97.1	95.2	P/P	90 - 110
Sodium	97.9	96.0	P/P	90 - 110
Zinc	99.1	98.5	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A105956

Included Lab Sample IDs: 2251505, 2251506

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.9	98.8	P/P	90 - 110
Sulfate	98.1	98.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A105961

Included Lab Sample IDs: 2251507, 2251508

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	96.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A106014

Included Lab Sample IDs: 2251507

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	99.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A106021

Included Lab Sample IDs: 2251508

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A106028

Included Lab Sample IDs: 2251513, 2251514

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.2	96.4	P/P	90 - 110
Antimony	101	99.9	P/P	90 - 110
Arsenic	101	102	P/P	90 - 110
Beryllium	96.2	95.6	P/P	90 - 110
Boron	97.6	97.4	P/P	90 - 110
Cadmium	100	99.3	P/P	90 - 110
Chromium	97.3	96.0	P/P	90 - 110
Copper	97.6	96.4	P/P	90 - 110
Lead	109	110	P/P	90 - 110
Nickel	97.7	96.4	P/P	90 - 110
Selenium	102	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A106028

Included Lab Sample IDs: 2251513, 2251514

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	98.9	98.1	P/P	90 - 110
Thallium	94.9	95.1	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A106083

Included Lab Sample IDs: 2251507, 2251508

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	100	100	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					3.05	
EPA 200.7 Rev. 4.4	Barium	98.0	99.4	102	100		1.50
	Iron	106	106	110	107		2.15
	Magnesium	105	102	109	106		2.21
	Manganese	99.7	101	103	101		1.68
	Potassium	101	98.3	105	102		2.85
	Sodium	104	103	110	106		2.89
	Zinc	93.4	98.0	99.0	97.7		1.32
EPA 200.8 Rev. 5.4	Aluminum	99.4	98.1	93.7	96.8		3.19
	Antimony	102	104	99.7	101		0.851
	Arsenic	102	103	99.5	102		2.07
	Beryllium	92.4	95.5	89.3	94.0		5.13
	Boron	107	101	97.3	98.0		0.664
	Cadmium	103	104	102	103		0.698
	Chromium	99.7	101	97.6	98.5		0.968
	Copper	100	102	98.9	99.5		0.543
	Lead	110	111	108	110		2.05
	Nickel	99.6	101	97.3	97.7		0.352
	Selenium	103	103	98.2	99.4		1.20
	Silver	101	101	103	102		1.13
	Thallium	104	107	102	104		2.85
EPA 300.0 Rev. 2.1	Chloride	97.6	92.4	95.1		0.714	
	Sulfate	98.6	93.6	96.3		1.08	
EPA 350.1 Rev. 2.0	Ammonia-N	104	99.6	99.8			0.184
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	103	102			0.957
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	100	102			1.97
EPA 365.1 Rev. 2.0	Total-P	103	104	105			0.989
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	99.0	97.8			1.22
SM 2120 B-2011	Color (true)	100				0.0044	
SM 2320 B-2011	Total Alkalinity	98.1				1.18	
SM 2540 C-2011	TDS					4.13	
SM 2540 D-2011	TSS					2.53	
	TSS					5.41	
SM 4500 F-C-2011	Fluoride	99.5	98.8	98.8			0.0
SM 5310 B-2011	Organic Carbon	94.8	94.6	95.5			0.812

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2251505, 2251506
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2251513, 2251514
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2251513, 2251514
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2251505, 2251506
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2251505, 2251506
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2251507, 2251508
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2251507, 2251508
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2251507, 2251508
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2251507, 2251508
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2251509, 2251510
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2251505, 2251506

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2251505, 2251506
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2251513, 2251514
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2251505, 2251506
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2251505, 2251506
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2251505, 2251506
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2251507, 2251508

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	06/02/2021			06/02/2021 15:46	Sarah A Nixon	2251505, 2251506
EPA 200.7 Rev. 4.4	06/02/2021	06/07/2021 14:20	Elliott D. Healy	06/08/2021 17:58	Betina Topolski	2251513
	06/02/2021	06/07/2021 14:20	Elliott D. Healy	06/08/2021 18:06	Betina Topolski	2251514
EPA 200.8 Rev. 5.4	06/02/2021	06/07/2021 14:20	Elliott D. Healy	06/11/2021 19:47	Alexander Thompson	2251513
	06/02/2021	06/07/2021 14:20	Elliott D. Healy	06/11/2021 19:57	Alexander Thompson	2251514
EPA 300.0 Rev. 2.1	06/02/2021			06/11/2021 18:19	Lipi Saha	2251505
	06/02/2021			06/11/2021 18:31	Lipi Saha	2251506
EPA 350.1 Rev. 2.0	06/02/2021			06/08/2021 12:31	Ping Hua	2251507
	06/02/2021			06/08/2021 12:32	Ping Hua	2251508
EPA 351.2 Rev. 2.0	06/02/2021	06/04/2021 13:01	Benjamin T. Nordmann	06/07/2021 10:34	Virginia P. Brown	2251507
	06/02/2021	06/04/2021 13:01	Benjamin T. Nordmann	06/07/2021 10:35	Virginia P. Brown	2251508
EPA 353.2 Rev. 2.0	06/02/2021			06/04/2021 10:10	Beverly Y. Sanders	2251507
	06/02/2021			06/04/2021 10:12	Beverly Y. Sanders	2251508
EPA 365.1 Rev. 2.0	06/02/2021	06/10/2021 12:25	Yen Ta	06/11/2021 10:11	Shengyu Ding	2251507
	06/02/2021	06/10/2021 12:25	Yen Ta	06/11/2021 12:31	Shengyu Ding	2251508
EPA 365.1 Rev. 2.0 dissolved	06/02/2021			06/02/2021 17:08	Ping Hua	2251509, 2251510
SM 2120 B-2011	06/02/2021			06/02/2021 16:48	Sarah A Nixon	2251505
	06/02/2021			06/02/2021 16:50	Sarah A Nixon	2251506
SM 2320 B-2011	06/02/2021			06/07/2021 22:29	Dale L. Simmons	2251505
	06/02/2021			06/07/2021 22:43	Dale L. Simmons	2251506
SM 2340B	06/02/2021			06/08/2021 17:58	Betina Topolski	2251513
	06/02/2021			06/08/2021 18:06	Betina Topolski	2251514
SM 2540 C-2011	06/02/2021			06/04/2021 14:29	Yijie Li	2251505, 2251506
SM 2540 D-2011	06/02/2021			06/04/2021 14:29	Yijie Li	2251505, 2251506
SM 4500 F-C-2011	06/02/2021			06/07/2021 22:29	Dale L. Simmons	2251505
	06/02/2021			06/07/2021 22:43	Dale L. Simmons	2251506
SM 5310 B-2011	06/02/2021			06/15/2021 01:25	Madeline Gruver	2251507
	06/02/2021			06/15/2021 01:38	Madeline Gruver	2251508